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Condensing and Molding Mill for the Manufacture of Peat Fuel.

The construction of the mill represented in the annexed engraving is the result of a long series of trials, and it is a practical success, turning out blocks of peat almost as solid as cannel coal—so solid, in fact, that they can be turned in a lathe in ornamental forms. The mill is all shown in the cut with the exception of the interior of the box, and this will be understood from a very brief description.

The upper portion of the box is divided by a series of horizontal partitions, the upper ones being open lattice-work, and the lower ones perforated with numerous holes. The upright shaft, which rotates in the center of the box, carries a series of arms or blades, extending alternately on opposite sides, and as these revolve they cut the peat and force it through the openings in the diaphragms. The lower portion of the box, in place of complete partitions, has a series of corrugeted shelves extending alternately from opposite sides, and the peat is pressed and scraped from these by a series of arms adapted to the work. By this series of severe operations the air bubbles are expelled from the peat, and it is reduced to a homogeneous paste. When it arrives at the bottom of the box it is still further compressed by the converging sides of the hopper, and it is received in light molds which are carried on an endless belt. The blocks are dried in the sun. The inventor says:—

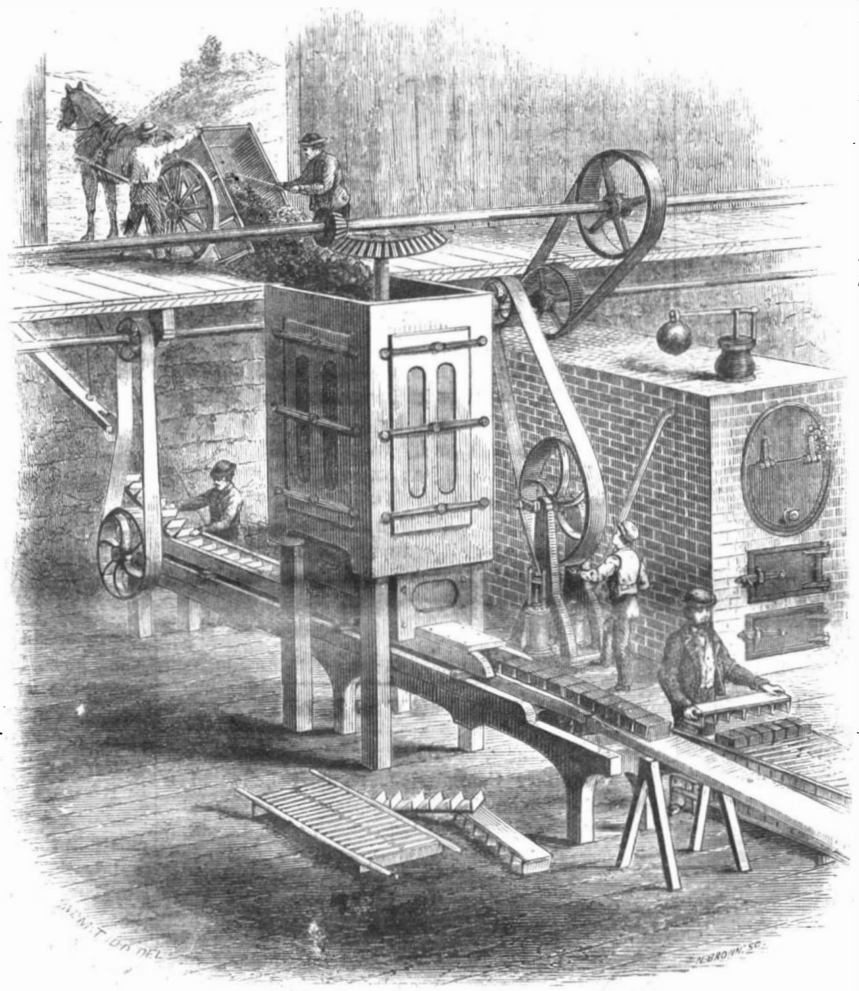
"Numerous attempts have been made to dry it by artificial heat, for which, of course, other buildings and apparatus would be required. Statements have been made that this is practicable; but our own experience does not demonstrate that it is, except at too great cost for labor and heat to be remunerative. Sunshine and wind cost nothing, and the business is done more effectually than by any other means; and if the fuel in any stage of manufacture is exposed to showers, or even heavy and repeated rains, it is not materially damaged, and the delay in drying is but little more than the actual duration of the wet weather.

"Our process is exceedingly simple, and the machinery equally so. The original organization of the peat is entirely destroyed, the air, of which a large amount is contained in its cells, is ejected; advantage is taken of some of the natural properties of the material; and the mass is condensed in its moist state, in which condition it is formed into blocks of convenient size and shape, and delivered from the machine to be exposed for drying, as before mentioned, in much the same manner as bricks are exposed in a brick yard.

"The fuel prepared by this process is called *condensed* peat in contradistinction to *compressed* peat—the material being absolutely condensed without employing any very considerable pressure in the process.

"Our works are at East Lexington, about ten miles from Boston, and are freely open to inspection.

"Peat varies in its character very materially in different localities; but, as a general thing, we estimate that it is reduced in the process of manufacture about two-thirds to three-quarters, both in weight and bulk, according to the character or composition of the crude material, and the drainage of the meadow or bog from which it is cut. Peat from a well-drained meadow retaining, of course, less water in the mass, is much more conveniently and economically manufactured than that from a meadow which is constantly overflowed; and the shrinkage, it will readily be understood, is less.



LEAVITT'S CONDENSING AND MOLDING MILL.

"From the best peats we can, of course, produce a superior article of hard, dry fuel; but an essential feature of our process is, that we are able to produce, with equal ease, an excellent fuel from inferior and comparatively worthless crude material.

"The cost of one set of machinery, which is $600, together with the needful buildings, engine, boiler, shafting, etc., may be any where from $2,000 to $3,000.

"One set of machinery turns out the material for ten tuns, or more, of dry fuel per day, of value at the present time of $10 per tun, which is equal to $100 per day. The cost of labor to produce this is less than $2 per tun; to which may be added as much more for cost of transportation to market—say whole cost, delivered in market, $4 per tun, and this shows a net gain of $60 on the product of each day."

Further information in relation to it may be obtained by addressing Leavitt & Hunnewell, No. 49 Congress street, Boston, Mass.

THE highest inhabited place on the globe is at Ancomaro, Peru, which is 16,000 feet above the sea.

The Physics of Absorption.

The curious fact pointed out by Pouillet, in 1822, that when a fluid is absorbed by a porous substance a rise in temperature occurs, has given origin to some strange explanations and discussions. The subject has recently been taken up by Jungk, who attributes the alteration in temperature to the formation around each particle of the porous body of a thin layer of fluid, "in which the individual molecules move with much less freedom; thus pointing to a condensation of the fluid in those parts." In support of his theory, he quotes a paper by Rose, on the errors which arise in the determination of the specific gravity, when the substance is weighed in a state of fine subdivision. The finer the particles of the body under examination, the greater will be the resulting specific gravity. He proceeds by assuming that the temperature of a body rises or falls when, by any external means, it is caused to assume the condition induced by the subtraction or addition of heat respectively. Applying this in the case of water, it would follow that when absorbed by a porous substance the temperature should either rise or fall according as the water is below or above or 4 degrees Centigrade—the point of maximum density. This, in fact, was found to be the case, and the results of his experiments may be shortly stated as follows:—1. The temperature of water, when absorbed by sand, is raised or lowered, according as it was previously either above or below 4 degrees C. 2. Water at zero, when absorbed by snow, is lowered in temperature. 3. The phenomenon may be regarded as a consequence of the condensation of the water on the surface of the absorbent body.—*Poggendorff's Annalen for* 1865.

THE ooze from the bottom of the Atlantic has been described by Mr. Sidebotham, in a paper read before the Manchester Philosophical Association. In the unsuccessful attempts made to raise the Atlantic cable, the grapnels and ropes brought up with them a quantity of ooze or mud, some of which was scraped off and preserved. He obtained specimens of the deposit from Mr. Fairbairn, and submitted them to microscopic examination. In appearance the deposit resembles dirty clay, and reminds one of the chalk of Dover; indeed, it presents such appearances as would lead to the inference that a bed of chalk is now being formed at the bottom of the Atlantic. It was composed entirely of minute organisms, which exhibited a very fragmentary condition.

CAPTAIN G. V. FOX, Assistant Secretary of the Navy, is about to leave the post which he has filled so long, in order to accept the Presidency of the new California Steamship Company, recently organized in New York, at a salary of $15,000 per annum. His verbal resignation has been tendered to the Secretary of the Navy, to take effect on the 1st of March next. On entering upon the duties of his new office, Captain Fox will remove to New York City.

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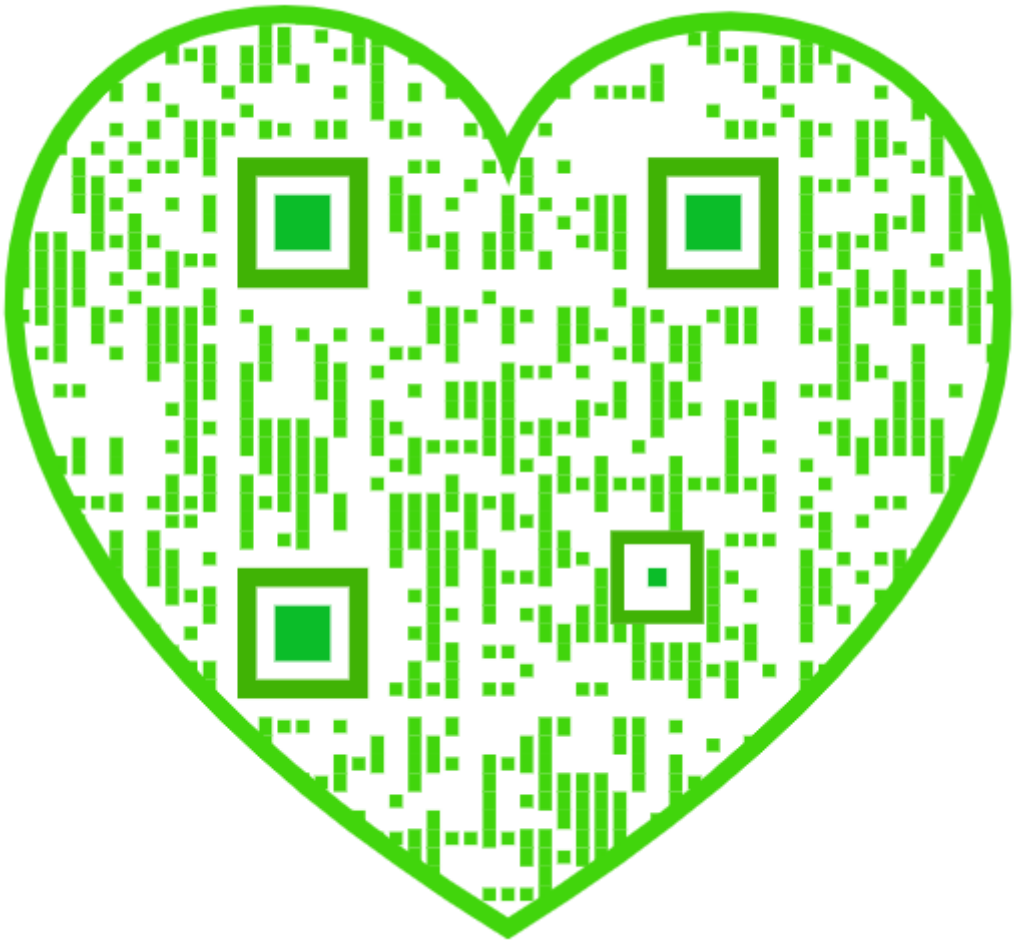

SOME STEPS IN ENGINEERING PROGRESS.

Our youthful cotemporary, the London *Engineer*, in announcing the completion of its tenth volume, gives a summary of engineering progress during the last decade; from this summary we extract a few items:—

THE LONDON DRAINAGE WORKS.

The Thames bridges sink into comparative insignificance when compared with the great metropolitan drainage works executed during the last few years. It would be impossible here to enter upon their consideration at any length; a few statistics will suffice to impart a general idea of their magnitude and importance. The first portion of the works was commenced on January, 1859, being about five months after the passing of the Act authorizing their execution. There are 82 miles of main intercepting sewers in London. In the construction of the works 318 millions of bricks and 880,000 cubic yards of concrete have been used, and 3,500,000 cubic yards of earth excavated. The cost when completed, will have been about £4,200,000. The total pumping force employed is 2,380 nominal horse-power; and if the engines were at full work night and day, 44,000 tuns of coal per annum would be used, but the average consumption is estimated at 20,000 tuns. The sewage to be intercepted by the works on the north side of the river at present amounts to 10,000,000 cubic feet, and on the south side to 4,000,000 cubic feet per day; but provision is made for an anticipated increase in those quantities, in addition to the rainfall amounting to 63,000,000 cubic feet per day, which is equal to a lake of 482 acres 3 feet deep, or 15 times as large as the Serpentine in Hyde Park.

In excavating for the works a large number of animal remains, ancient coins, and other curious objects, were found, most of which have been deposited in the British Museum. With the exception of the low-level sewer on the north of the Thames, which will drain about one-seventh of the metropolitan area, the whole of the main drainage scheme is finished and in active operation. His Royal Highness the Prince of Wales, set in motion the engines at Crossness on the 4th of last April, and thereby completed the opening of the works. We may here remark, *en passant*, that the ventilation of these sewers has received some attention from the Metropolitan Board of Works during the last year; as an experiment, the southern outfall sewer is now ventilated by the furnaces in Woolwich Dockyard.

GREAT BRIDGES.

When we speak of so many works we are apt to forget their real magnitude, and it may be worth while to pause for a moment and compare those vast bridges with others which have become in a sense historical. The Great Bridge over the St. Lawrence at Montreal has a total length of 9,184 feet, with twenty-five openings; one having a span of 330 feet, and the rest spans of 242 feet, with a headway of 60 feet. The Britannia Bridge over the Menai Straits is 1,487 feet long without the abutments, with two spans of 230 feet each, one of 458 feet, 8 inches, and one of 459 feet, and the Saltash Bridge, 468 feet. Against these we have the Forth Bridge with a length of 10,550 feet, the Severn Bridge with a length of nearly 12,000 feet. Can it be maintained that we have no giants in the profession in these latter days?

STEEL SHIPS.

In shipbuilding we have nothing very novel to record. The composite system appears to hold its own, and even to make considerable advances. Steel, too, is being largely adopted, both in the form of plates and angle bars. The success with which the *Clytemnestra* stood the terrible ordeal of the Calcutta cyclone must yet be fresh in the memory of our readers. With such an example before them, it will be strange if other ship builders do not follow the example set by Messrs. Jones, Quiggin & Co. It is possible that the comparatively high price of steel has done more to retard its adoption than any notion as to its unreliable qualities entertained by ship owners. This objection only requires time for its removal. In the first place, the labors of Mr. Bessemer have done much to cheapen steel, and will do much more; and in the second the weight of material required to construct a hull of similar dimensions from steel is so much less than when iron is employed, and the capacity of the ship is thereby so largely augmented, that the questions connected with first cost are reduced within very small dimensions indeed.

A NEW TURRET SHIP.

We find with some pleasure that in addition to the iron-clad frigate *Hercules*, ordered to be built at Chatham Dockyard, the lords of the Admiralty have decided on the construction there of the first of an entirely new kind of turret ship (?) combining all the latest improvements in that particular principle of construction. The preparation of the designs for the new vessel has been intrusted by the Admiralty to Mr. Reed, from whose plans and under whose superintendence the new turret ship will be built. She is intended to carry two turrets, each plated with armor of enormous thickness, and sufficiently powerful to mount 600-pounder Armstrong guns. In the drawings and plans for the *Hercules*, now in course of preparation at Chatham Dockyard, Mr. Reed originally designed that vessel as combining the broadside and turret principles in the same ship; but, in consequence of the decision of the Lords of the Admiralty, just determined upon, to have an experimental vessel built entirely on the turret principle, the turrets intended to be placed in the *Hercules* will be dispensed with, and she will accordingly be constructed as a broadside ship, with armor plates exactly double the thickness of those of the *Achilles* and *Warrior*. The new turret ship will be built simultaneously with the *Hercules*. We are anxious to know what part Captain Coles will be permitted to take in her construction and design.

BOILER INCRUSTATIONS.

Surface condensers enjoy considerable favor, although they have not attained to the position once expected for them. It is not probable that any further great improvement in the economical working of the marine engine can be secured, without the adoption of some system by which the sulphates of lime and magnesia may be precipitated in a separate vessel by heat, before the feed is forced into the boiler. With the introduction of an efficient separator it will become possible to use higher pressures, larger measures of expansion, and lighter machinery than are now practicable; and we believe that were attention once fairly turned in this direction much good might be done.

HEALTH AND HOW TO KEEP IT.

Dr. C. R. Agnew, of this city, a prominent member of the Sanitary Commission, recently delivered a popular lecture on the above topic.

Four things indispensable to health were discussed and illustrated, viz.: Clothing, food, air and exercise. And first the doctor drew attention to the care and treatment of children. He said that while children should be allowed as much open air and exercise as possible, they should be properly and warmly clothed to insure and maintain health, and he suggested that flannel should be worn next the skin by both adults and children, as it had been scientifically demonstrated to be more conducive to health than anything else. The proposition was illustrated in the progress of the lecture. Children should not be allowed the range of the table. When the babe is born its first need is milk, and that continues to be its proper diet for many months. Then, as its physical strength increases, the capacity of the stomach for digesting other food is better developed, but a child should always be kept on plain, substantial food, and with this and warm clothing, according to the season, pure air and proper exercise, the immense amounts paid annually in doctor's bills may be saved. The doctor then related an incident in the experience of an English sea captain, who made voyages to South America, and who always compelled his crew to wear flannel next the skin, never allowed them to sleep in damp places, changed the diet according to the latitude, from flesh to vegetable food, and *rice versa*, and prohibited the use of alcohol on board; and while in the port of Valparaiso, during the hottest summer months, there was not as much as one man on the sick list, while in five other ships lying beside him the deaths were from thirty to fifty per day. The properties of alcoholic drinks, and the evil effects thereof, were then pointed out, and it was shown that there is no nutriment whatever in alcohol, yet thirty-five millions out of the ninety million gallons manufactured annually in this country is consumed by the people of the United States. This quantity, at two dollars a gallon, makes seventy million dollars—a small estimate of what we pay for this beverage which kills but does not cure. This gives about 1⅓ gallons to each individual, and as the women drink very little and the children none, it will be judged what quantity the male population consume. Six million barrels of beer are also consumed by us annually, but in this matter we are far behind John Bull, who consumes twenty million barrels of beer annually. The effects of these stimulants upon human health were made very apparent some years ago among the British army in India, where out of an army of 70,000 men the deaths were about a brigade a day. It was evident to the Government that they could not keep the army recruited with such a fearful mortality as that. An inquiry was instituted, experiments made, and the cause of mortality was traced to the use of alcoholic beverages, which were thereafter forbidden. The doctor then impressed upon the audience the necessity of allowing the sunshine and the pure air to enter their dwellings, and illustrated the former by facts which came to light in a district of Paris, some time ago, where the people were pallid and filthy from living where the sunlight could not reach them, so that the French Government had to interfere and shut up the places. To secure pure air, and plenty of it, he suggested that, when possible, sufficient fire should be kept up to allow the windows to be kept open, but in cases where this could not be, one augur hole for every member of the family should be bored in the window sashes. Gas burners, stoves, lamps, and whatever is in a state of combustion in a room, consumes the oxygen which should go to the support of human life, and the effects of a continuation of this will appear from the fact that an ordinary gas-burner consumes as much oxygen as a healthy man. The doctor next alluded to damp places, especially sleeping apartments, and suggested to the mothers present, of whom there were a large number, to scrub their rooms during their children's absence at school or elsewhere, and to see that they were thoroughly dry before allowing the little ones to go to rest in them. And this led him to speak of damp cellars, which he said ought to be properly cleaned out, now during the winter months, if not by the landlords, then, as a matter of healthful economy, by the tenants themselves. The deleterious effects of decaying matter in cellars and low places was then illustrated by reference to the fungus, which, at the first ray of sunshine, sends forth its poisonous perfumes to circulate in the atmosphere around, causing sickness and death. The lecturer remarked that, as all the suggestions he had made were important in view of the cholera, which might be here in the spring, he hoped the audience would give them the attention they deserved.

Discipline of the Workshop.

M. Leclaire writes:—"Every difference between comrades should rest at the door of the workshop. The duty of the foreman consists in acting only with the greatest justice toward all the men who are under his surveillance—in having regard neither to nation, nor country, nor humor of each, but only to the good conduct and aptitude of the individual. He ought, in giving his orders, especially to deal tenderly with the self-love of the person—to invite rather than to command—the head of the establishment exacting nothing but the accomplishment of the reciprocal duties, and the exact execution of the regulations. Every injustice on the part of the foreman ends but in compromising the interests of the concern; it is for the just man to do to others only that which he would wish should be done to him. The foreman knows by experience how little agreeable it is to publicly receive imperious orders; he knows, besides, that, at the point of civilization where we are, it is not fear that inspires men with respect and obedience, but emphatically reason."

BAROMETERS AND THERMOMETERS.—Makers of these articles will do well to advertise in the SCIENTIFIC AMERICAN, for we have inquiries from our readers.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 25, 1866, the President, Prof. S. D. Tillman, in the chair.

THE BEST MODEL FOR STEAMBOATS.

H. B. Wilson, Esq., presented a paper on the best form of steamboats, and remarked that, being troubled with bronchitis, he would request Mrs. Wilson to read his paper.

Mrs. Wilson—a handsome lady—took a chair on the platform and proceeded to read the paper. She proved to be an excellent reader with a clear voice, and though the paper was very long, it was listened to with interest and attention throughout. It advocated very sharp ends for boats, with a level floor carried to the extreme end of the bow; with comparatively narrow guards, diminishing in width toward the ends, where they terminate in a point, so as to avoid loading the ends, and thus obviate the necessity for stay rods and masts; and the adoption of iron or steel as a material. The change of material was urged with especial force and earnestness, as a boat made of iron would be materially lighter than one made of wood and a great deal more durable, while steel would be only two thirds the weight of iron and still more durable. Objection was also made to trimming boats by the stern, as this increases the area of the immersed cross section and the depth of draft—both augmenting the resistance. The opinion was expressed that, with all the suggestions adopted, a boat might be constructed that would run twenty-five, and even thirty miles an hour.

Considerable discussion followed the reading of the paper; we note only the remarks of Mr. Dibbin, who said that the English were driving the Americans out of the ocean steamship trade, simply by the use of iron and steel as a material for vessels. When wood was the principal material for ships we had the advantage of the English; we built lighter, faster, and better ships, and we had the largest amount of shipping of any nation. But since iron and steel have been introduced, the English have the advantage of us, and they are driving our steamships off the ocean. Go round our docks, and you will find our wheat and cotton being loaded into English, French, and Bremen vessels, while American steamers have been withdrawn from the trade. This change is not a result of the war, for it was going on before the war. It is the result of the use of iron for ship-building, a material that can be produced in Europe more cheaply than it can here. Iron is not only lighter and stronger than wood, in the long run it is far cheaper, for it will last two or three times longer than wood. Look at the rating of an iron ship seven or eight years old; if she was A 1 when she was launched, she is still A 1. The speaker had no doubt that we should again go ahead in the ocean steamship trade, but the only way that we can do it is by building our vessels of iron and steel.

Lighting Up of the Capitol Dome.

[For the Scientific American.]

The efforts of Mr. Samuel Gardiner, of 271 Broadway, New York, in this enterprise has been crowned with triumphant success. For two years and a half, the arrangements have been quietly perfecting, and on the evening of the 23d of January the beautiful dome was illuminated from three circles of burners invisible from the floor, and containing 1,100 jets, from 6 to 12 inches apart, bringing out in splendid relief, the picture executed by Mr. Brumidi on the ceiling of the inner dome, at a hight of 180 feet from the floor of the rotunda.

The means for operating the battery, turning on and off the gas, and lighting each tier of burners, are brought within a space of two feet square in a passage way within a few feet of the floor of the rotunda, and consist of a handsome silver-mounted dial plate with keys, eleven in number, one in the center by which the primary connection is made, and the required amount of battery brought into operation, the others being for the gas and lighting connections of the respective tiers. These tiers, it may be here mentioned, are three in number at present. The first, containing 300 burners, at the lower cornice, 45 feet from the floor. The second, of 325 burners at a cornice 80 feet from the floor. The third tier, 425 burners, 165 feet from the floor surroundiug the balustrade, and near the margin of the picture on the ceiling. One tier at the spring of the dome has not yet been put up, and may not be found necessary, nor has the column of 60 burners, in a vertical series of circular clusters, yet been lighted on the tholus, 264 feet above the floor.

The work of layiug the pipe and adjusting the burners, has been a fatiguing and perilous labor, and causes a shudder as we look at the ledges respectively 22 inches and 16 inches wide, and 45 and 80 feet from the floor of the rotunda, upon which the electrician and his workmen operated, for weeks consecutively, without scaffold, rope, or ladder.

The first and second series of burners are entirely inaccessible, all are invisible from any part of the floor, and every possible manipulation is executed at the dial plate on the floor by the exertion of a few ounces pressure on the appropriate key, the gas stop-cock to each tier being operated by an electro-magnetic engine in its vicinity, which receives its impulse from the battery, the central heart of the concern, communicating light, heat, and force under the guidance of the brain which directs the current at will through the five miles of wire. This heart of the apparatus, whose impulses are thus sublimely directed, is housed in and fully occupies an elliptical room 45 by 36 feet, and consists of 200 jars, arranged on tables in concentric series, each jar being 13 inches in diameter, 14 inches deep, and so arranged as to be thrown on or off in sections of 20, by the key on the before-named dial plate in a passage remote from the battery. A vernier on the dial plate, in connection with a pointer on the central key, indicates the extent of the battery, which is brought into operation by the revolution of the key. Openings in the dial expose dark and light segments of the wheels on the gas keys so as to indicate the shut or open positions of the gas stop-cocks at the tiers 45, 80, 165, and the cluster 264 feet above. Owing to the hight, a gas regulator is provided at the stop-cock of each tier, which equalizes the flow. No. 10 copper wires are used throughout, and, after being wrapped with linen, are inclosed in india-rubber tubing, and incased or otherwise secretly laid, passages in the walls being drilled therefor through a thickness of from 3 to 20 feet. The return circuit is made through the gas pipes, saving a duplication of the nine thousand yards of wire. The burners used have an indestructible lava tip, which acts as an insulator, and each is provided with an insulated coil of platinum wire, which sets on one side of the orifices so as not to interfere with the free exit of the gas, while exposing one side of the jet to the action of the red-hot metal when the electric connection is made.

The experiments have covered a period of nearly ten years, and six patents, issued through the agency of Munn & Co., cover the main features of the invention. The experiments on so grand a scale as the Capitol dome, with 1,100 burners, at such distance and elevation, settles the question of success, and the invention will come into general use for lighting theaters, concert and public halls, and eventually, by large central batteries, will ramify over city districts to afford to residents, merchants and manufacturers, a connection for the purpurpose of instantaneous illumination to any extent desired.

A committee appointed by the Secretary of the Interior, were present on the next evening when the dome was again lighted, and the Secretary, Commissioner of Patents, Engineer of the Interior, the former and present architects of the Capitol, and the Secretary of the Smithsonian Institute, expressed themselves much pleased with the entire success.

Mr. Gardiner deserves a great deal of credit for the breadth of conception and skill in execution, and has encountered the usual fate of inventors who propose bold and original designs—the joint praise of some, and the sturdy unbelief of others—but is rewarded, as are a host of his sympathizing friends, by success equal to his merit. The House of Representatives and the Senate may be thus lighted, and avoid the present system of lighting by gas fuse, which allows a great escape of gas, and is exceedingly disagreeable to all the members except those from the oil region, who snuff it up as Jove did the perfume from the nectar cup.

The picture on the ceiling of the dome, covering a space of six thousand square feet, and painted by Constantine Brumidi, who has been ten months engaged upon the work, is exhibited to great advantage by the illumination. The visitors who entered the rotunda in darkness, and waited for the artificial light to dawn for the first time upon the splendid interior, which is so imperfectly revealed by the circle of windows below the spring of the dome, were amply rewarded for their journey on a stormy evening, the space above them showing like an immense vault through whose open mouth the heavens were visible, peopled with the fraternizing demigods of ancient and modern times.

Ink Prints from Photographs.

We have before described the processes of Swann & Woodbury, of England, for this species of printing. The following is still another account of the same general method, which we find in a recent number of *Humphrey's Journal*:—

"A plate of mica is coated in the dark room with a warm solution of bicarbonate of potassa and gelatin. The plate, so prepared, is sensitive to light. When exposed, the parts, upon which light acts, become insoluble, whilst those, upon which the rays have made no impression or but a feeble impression, are quite soluble or partially soluble according to the action of the light. After exposure the plate of mica is immersed in water, which leaves the gelatin undissolved in accordance with the action of the light, and dissolves the rest. The remaining gelatin film is dried when it becomes quite hard. The reader will easily conceive that such a film is quite uneven, presenting depressions and elevations in the ratio of the actinic actions; thus, where light has had the most powerful effect, the elevation will be the greatest, because more of this part of the film will have been washed off, and *vice versa*.

The next part of the operation consists in preparing a soft and smooth metal plate, upon which the mica plate is placed, the gelatin film being in contact with the metal. The two plates are now pressed into intimate contact by means of rollers. The gelatin film is sufficiently hard to make an impression on the soft metal, so that, after the pressure between the rollers, the soft metal becomes the reverse of the gelatin impression, the elevation becoming now a depression, and *vice versa*.

The next step consists in preparing a solution of gelatin colored to taste, pouring the same upon the metal reverse, or otherwise filling the inequalities of the plate with the ink, and then pressing a sheet of paper upon the plate thus charged with ink, and allowing the gelatinous film of ink to dry. Where the film of colored ink is thickest the shade will be darker, and where it is most thin, we have the highest lights. It is hence necessary, as the reader will perceive, to use transparent positives instead of negatives for the bichromated film."

NEW PUBLICATIONS.

BEADLE'S MONTHLY.—This is a sprightly little periodical, well conducted and put forth in handsome style "The Review of the Northwest Passage by Land," is good reading and if the book itself is half as good as the condensed account in the monthly, every one should buy it. The monthly is called "a magazine of to-day," and the title is justified by the contents, which are varied and attractive. The illustrations are superior, some of them being beautifully done. Beadle & Co., 118 William street.

EVERY SATURDAY is the title of a new journal of choice reading just commenced by Ticknor & Fields, of Boston, Mass. The articles are selected from foreign current literature, such as incidents of travel, essays critical and descriptive, short stories, biographies, etc. It is a capital publication and is well received. Terms $5 00 per annum.

The No-ink Pen Swindle.

We continue to receive letters from parties who have been victimized by scoundrels who advertise "a no-ink pen," falsely stated to be recommended by the SCIENTIFIC AMERICAN. The swindlers lately advertised from Newburgh, N. Y. They change their address from place to place, as fast as the cheat is found out.

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CARVALHO'S APPARATUS FOR SUPER-HEATING STEAM.

[Communicated.]

The present high price of coal would seem to render any efficient method for economizing it particularly worthy of attention. The invention here illustrated is an improved apparatus for super-heating steam, and thereby economizing fuel. The principal losses attending the use of ordinary saturated steam are occasioned, first, by the particles of water which it holds in suspension, together with water "primed" over from the boiler, passing into the cylinder, and detracting from the economy and efficiency of the engine; and, second, by its unwarrantable partial condensation in cylinders, steam chests, and pipes.

When the temperature of saturated steam is in the least degree reduced by its passage through pipes or by expansion in cylinders, a portion of it is condensed. This loss by condensation renders it impossible to realize in practice the theoretical gain due to the use of steam expansively. Now, if the steam be moderately super-heated, it is not only expanded as a gas, and its elasticity greatly increased, but it is thoroughly dried, and its watery particles being vaporized, are utilized as steam. The economy of this super-heating is found in practice to amount to from twenty to thirty per cent of the fuel used. Boilers deficient in power are rendered entirely effective by the use of a super heater, thus avoiding the necessity of blowers.

The amount of heat required for super-heating steam is trifling, and is expended with far greater economy than where employed in generating steam from water. This is readily understood when it is remembered that, in the evaporation of a pound of water from 212° into steam, about 900° of heat are rendered latent, while an addition of only from 50° to 100° of heat to steam already generated, increases its volume, as a gas, one-fourth, vaporizes its watery particles, and prevents its condensation in cylinders, pipes, etc. In fact, the advantage resulting from the use of super-heated steam, will hardly be questioned by any one who has given the subject his careful consideration; the great drawback to its universal employment being the want of durability in the super-heating apparatus employed. The ordinary collection of small wrought-iron pipes used for that purpose have not been found durable, and also give trouble by leakage at their many necessary joints. Steam is readily decomposed by heated wrought iron, the gases thus formed being exceedingly destructive to the inside of the pipes, while the action of the fire on the outside causes them to scale.

It is with a view of remedying these defects that Carvalho's improved super-heater is offered to the public. This invention has been awarded silver medals at the Fair of the Maryland Institute, and also at the Fair of the American Institute, of this city, at both of which places it was exhibited in operation.

Fig. 1, which is a section of one form of the super-heater, shows the coils of wire with which they are filled; the form, however, generally employed, is a double pipe of the ⊐-shape, as this gives more surface for superheating the steam, and also brings both of the connections on the same side, which is often found a convenience in practice. The coils of wire are partially flattened so as to present as much surface as possible to the sides of the chamber; they are locked together and introduced in a mass. Their object is to convey the heat away from the sides of the chamber, thus keeping down its temperature, and also to heat up the direct current of steam, causing every particle of it to become thoroughly dried and super-heated.

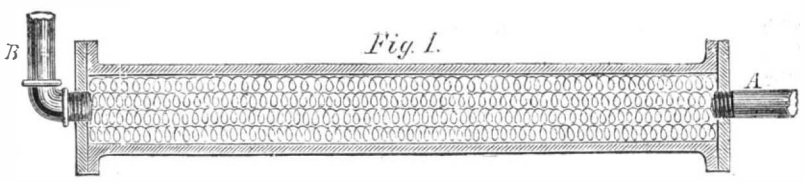

Fig. 1.

The heating surface of the chamber is proportioned to the amount of steam generated, and the coils present a surface double that of the chamber, these two being proportioned, so as to effectually dry and expand the steam without raising its temperature to an unnecessary or hurtful degree. The best results are obtained by a moderate degree of super-heating, as that is sufficient to evaporate the surplus moisture of the steam and prevents its accidental condensation.

The apparatus described is seen to be simple in construction and principle, and as its joints are all out of the fire and its material cast iron, it is very durable. Figs. 2 and 3, which are sectional side and end views of an ordinary flue boiler, clearly show the method of applying the super-heater to that type of boiler. A super-heater of the ⊐ pattern, seen in both views at D, is placed under the boiler, back of the bridge wall, where it will receive sufficient heat to thoroughly dry and expand the steam passing through it. Steam enters the super-heater from the boiler, at A, and is delivered super-heated, for any purpose required, at B, the degree of heat in the steam being determined by the distance of the chamber from the fire.

When highly super-heated steam is required, as for manufacturing or chemical purposes, it is claimed that the super-heater may be placed directly in the fire, without danger from decomposition in the steam, for by a simple preparation of the coils, which act as compensators, this decomposition is renovated and pure steam delivered as when at a lower temperature. This is an important feature in the invention.

By the use of a check valve between the super-heater and the boiler, the elastic force gained by super-heating is prevented from re-acting upon the boiler, thus making the super-heater the fulcrum of the power. The valve opens at every stroke of the piston, and closes when the steam in the super-heater is expanded by the heat. It is claimed that a weak boiler may, in this way be worked with a greatly increased pressure in the cylinder.

The official report upon the apparatus, as applied to the boilers of the Ordnance Department of the Washington Navy Yard, showed that an increase of five revolutions in forty were obtained from the engine with only one-third of the ordinary pressure, the consumption of coal being very much diminished. Where the apparatus is employed in this city for warming buildings, an extremely low pressure only is required to preserve the steam in the highest rooms of the building without condensation, and with greatly increased heating effect.

In marine boilers provided with high steam jackets around the smoke pipe, the introduction of the coils of wire into the space by increasing the super-heating surface has been found to economize fuel; and, by equalizing the temperature of the inner lining of the steam chimney with the steam, preserves it from that internal corrosion which has given much trouble in that class of boiler.

Sugar refiners, refiners of petroleum and other liquids, manufacturers of steam-heating apparatus, and others, should examine the practical working of this super-heater. Much greater heating effect will be obtained by super-heating their steam, and less fuel will be required, the steam being furnished of any required temperature.

The super-heater may be attached to every variety of boiler, new or old, at small expense; its use, it is claimed, lessens the dangers from explosion, and effects a great saving in fuel. It is perfectly under control, and requires no extra attention. The following are some of the advantages claimed: First, its simplicity, practicability, and durability; second, its easy adaptability to every form of boiler—stationary, marine, locomotive, etc.; third, its cheapness of construction; and, fourth, its peculiar method of compensating for the decomposition of steam by heat—a feature not possessed by any other super-heater. Further particulars will be given by addressing the general agent, Henry W. Bulkley, consulting engineer, No. 57 Broadway, New York.

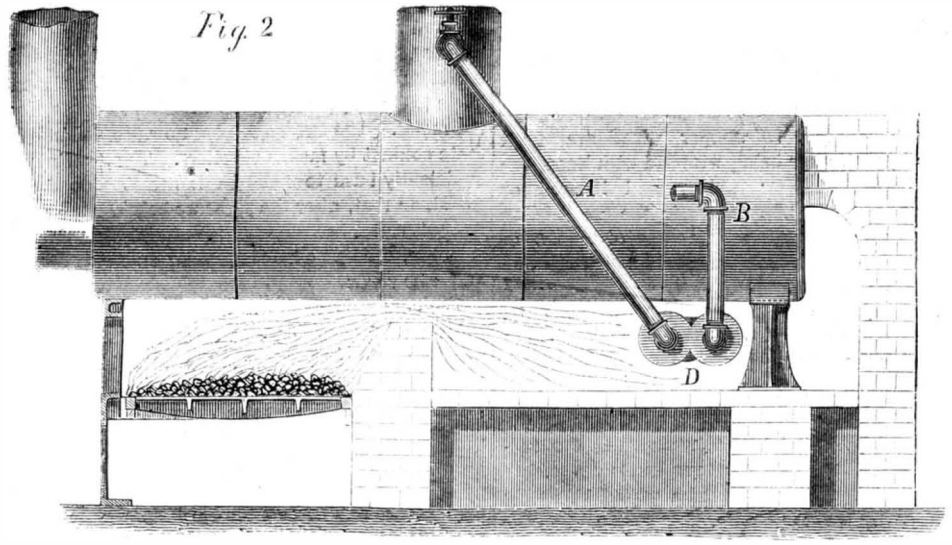

Fig. 2

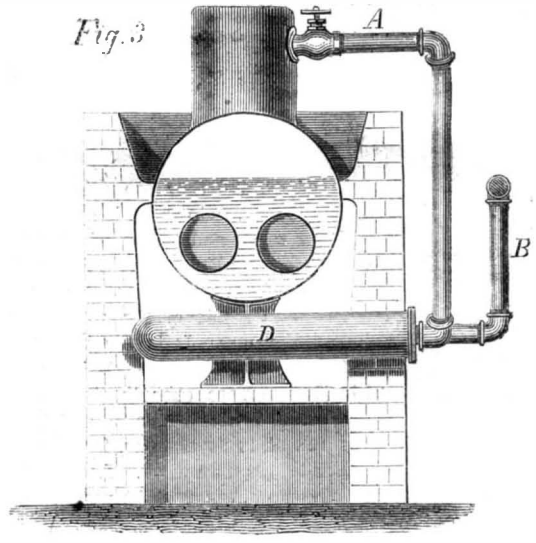

Fig. 3

The Weight of Hay in Mows.

At the last meeting of the Farmers' Club, Mr. Solon Robinson said that a few years ago the *Tribune* invited communications, stating facts in relation to the actual weight of hay per cubic foot in mows; and answers were received from persons scattered from Maine to Iowa. From all the statements, it seems that it takes about 425 cubic feet of hay to make a tun; and, except at the bottom of old mows, or at the top where the hay is light, the weight does not vary much from this. One man in Maine wrote that he had a mow 40 feet long, 16 feet wide and 14 feet high; the hay had been sold and weighed out of this mow for 15 years, and the average was 425 cubic feet to the tun.

IMMENSE progress has been made of late in France in all matters connected with iron work.

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THE FOOT LATHE.

Number 9.

(Concluded from page 83.)

The subject of fancy turning is continued, and the series concluded with this article.

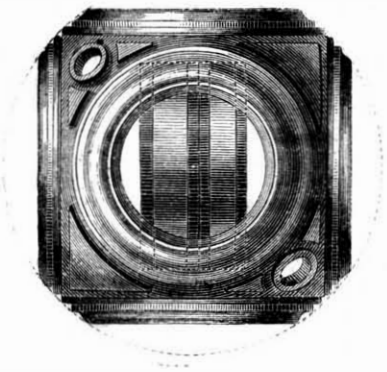

Fig. 45.

Fig. 45 is another, a little more ornate and of a different pattern. The process is essentially the same except that there are no spurs and a solid disk is left inside. This disk is turned out of a ball, left inside the exterior shell. One side of it is squared up before the ball is cut free from the globe, and the job is then reversed and the other side squared. The ball is then cut free and the loose disk is held fast between a flat-ended driver in the live spindle and a loose flat-ended button on the back center. The diameter is then decided through the hole which is toward the reader.

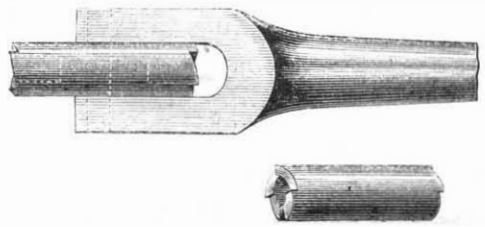

Fig. 46.

A little tool which is very convenient for making small screws is here shown, rather out of place, but it was overlooked before. In construction it explains itself. Holes of different sizes are made in a steel rod, and the end filed into shape, as seen. It has been found difficult by some to make these cutters work, but that was because they were not properly made. The trouble lies in drilling the hole. When the drill starts at first the hole is larger on the outside, so that the screw blank, when cut, gets tighter as it goes in and twists it off.

The remedy is to drill the hole in some distance and then turn off the outside end so that it gets where the bore is the same size. This refers only to small bolts a sixteenth of an inch in diameter; where they are large, the trouble mentioned is not experienced.

It is convenient to have two sizes in the tool so that the heaviest part of the work can be done by one cutter, the tool reversed by turning it over in the fork of the jaws and finishing the blank with the last cutter. A watchmaker's fine saw is to be used to sever the screw from the rod. The tool itself is to fit in the spindle of the tail stock, and the screw wire is held by a drill chuck.

In the matter of ornamental work there are other details and results in vogue among experienced turners which can only be alluded to, not discussed at length, for the reason that the styles are so numerous that an elaborate work might be made of them alone, with great profit. The scroll chuck or geometrical chuck, as it is sometimes called, is a complicated piece of mechanism, too costly for general use, and too limited in its application to mechanics in general to be of much utility. It does such work as may be seen on bank bills. The chuck plate on which the work is fixed is connected by a train of gearing on its back, with a fixed gear about the spindle on the head stock, so that when the relation these gears bear to one another is altered, the motion of the work on the chuck is accelerated or retarded, or is made to assume certain positions. An elliptic chuck is quite another thing, the work done by it is shown in this figure, which consists, chiefly, of ornamental designs disposed in a certain order. In fact the changes that can be made are infinite.

Fig. 47.

Minor matters without number, appertaining to the management of the hand lathe, have had no mention in these articles for the simple reason that our attention has been given to the principal points.

In the matter of mandrels—arbors, as many call them—nothing has been said, but it is a very useful tool. Mandrels are made of wood and steel—usually steel, and never of wood, unless for some special reason. As, for instance, when a large brass ring has to be turned. For this use a wooden mandrel is cheaper and more quickly made than a steel one. Besides, it is quite as good. Wooden mandrels should have iron center plates let in them so that they will run true; if the center was made in the wood itself, it would be liable to run out. Take a piece of sheet iron one-eighth of an inch thick and one inch square, hammer the corners thin, then turn them over at right angles with the plate. This gives four sharp corners, so that when driven in the end of a block it will not slip; three small screws will hold the plate to the mandrel so that it cannot get loose. The center must then be countersunk, as any other is. Such a mandrel made of hard wood, hickory for instance, will last a long time. Fibrous wood, such as white oak, makes a good mandrel for the reason that work, driven on it, compresses the fibers instead of scraping them, so that the size of the mandrel is unchanged.

Steel mandrels should be turned two in one, or largest in the middle, for small work, each end being a different size. Each end should be thoroughly centered with a drill and countersunk, and a flat place filed so that the dog will hold; not a scratch with a tool should ever be made in one, though few persons will take the pains to avoid doing this.

It is unnecessary to tell the mechanic he must have a rack for his tools, but we may tell the beginner so, and he will find it a great convenience.

Nothing has been said about drills, either, but they are quite indispensable. Now-a-days, however, the twist drills made and sold in all the tool stores are so uniformly superior to any thing that can be made by hand, or by individuals, and are, moreover, so cheap that it is foolish to make drills. Those who have never used them should not fail to order sets. They run all sizes, from a needle to an inch.

There are not a few turners who spoil work simply from heedlessness. Not because they do not know any better, but because they are averse to taking a little extra pains. If a mandrel runs out of truth a very little, sooner than alter it, or make a new one, they will try to "make it do." The result is easily seen when work is to be put together. Moreover, many persons use little caution in setting their work in the lathe. Instead of always putting it in the same place, driving it from the same side of the face plate, it is entered at hap-hazard. It is not good to get in the habit of doing work in this way, for it soon leads to recklessness.

Some are too lazy to go and grind their tools when they know it should be done, and continue to use them to the ultimate damage of the work. It is easy for the practiced eye to see these apparently small things, for they constitute a great part of the difference between a good workman and a bad one.

CONCLUSION.

It is obvious to all who have read these articles that they might be continued *ad infinitum*, until every tool ever used, and every piece of work ever made, was described and descanted upon. As this is manifestly unnecessary, and as the purpose has been merely to treat upon a few leading principles in the management and use of the hand lathe and its tools, we shall stop here. We know well enough that, to the expert or to the practiced journeyman, all that has been said in previous pages is but a tithe of what might have been; but it is hoped that much of the matter is new and useful to many who are not journeymen, but amateurs and novices, and that both pleasure and profit will result from them.

KOCH'S BORING TOOL.

This tool is for boring oil wells, and is intended to facilitate the operation by combining three tools in one, so that frequent withdrawal, or change of one to another, is rendered unnecessary, and the well goes down quicker in consequence.

The details are shown in Figs. 1 and 2. The cutting end is formed into a drill on one side, and a reamer and sand pump on the other. The two first are easily seen, while the sand pump is clearly shown in Fig. 2, section. The pulverized rock removed by the cutting edges is forced by the action of the tool up through the passage, A, and through the valve, B, into the chamber above, while the water runs out through the apertures, C. The sand, etc., remains in, and accumulates until the chamber is full, when it

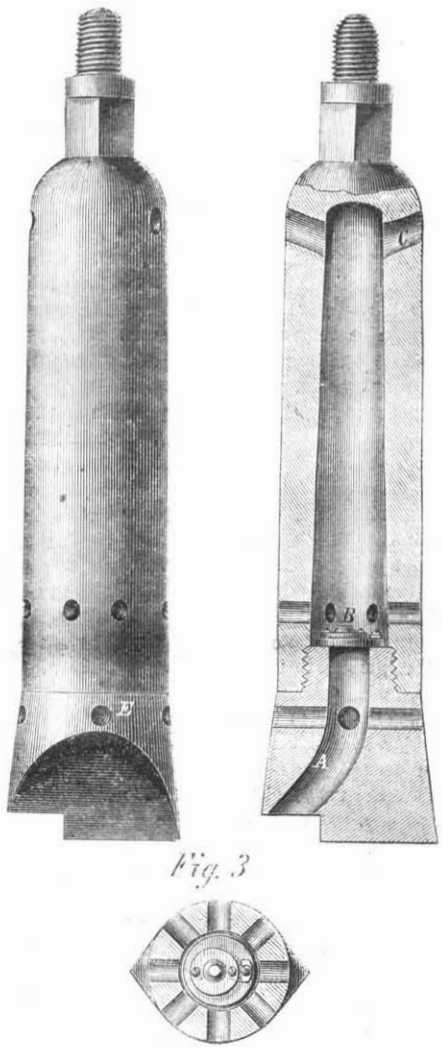

Fig. 3

may be removed. This plan of forming a sand pump in the boring tool, besides the convenience above noted of having two tools in one, causes the cutter itself to work much faster, for having a comparatively clear space, the blow is not checked through falling, or being taken off by a bed of sand, as it is commonly.

It is claimed that this tool will preserve the crevices or oil seams unimpaired, so the well will flow, if there is any oil near it.

The holes, E, are to attach the cutter to the chamber, and may be stopped when at work or not inserted at all.

A patent is pending on this tool through the Scientific American Patent Agency, by G. F. Koch. For further information address him at Cass, Pa.

MAGNESIA obtained by calcination from chloride of magnesium will, when exposed to the action of water for some months, acquire considerable consistency, and become hard enough to cut marble. A lamina of this magnesia of moderate thickness is translucent, like alabaster. With this substance casts may be taken as if with plaster of Paris, only the former sets under water. A mixture of chalk and magnesia in powder, made up into a paste with water, is good for molding, and will become exceedingly hard under water.

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Correspondence

Power Required to Drive Machinery.

Messrs. Editors:—As you have in former numbers of your valuable paper invited correspondence regarding the power required for machinery, I send you a few notes concerning a wooden-ware manufactory at this place, of which I have the superintendence.

The power for driving the machinery, and steam for heating the building, is derived from two boilers 24 feet long, 4 feet diameter, containing two 16-inch turn flues each. The arches contain 54 square feet of grate surface, and a good draft is secured by a smoke stack, 58 feet high above the flues, 2 feet 11 inches diameter, placed at the side of the boilers, with no short angles in the passage from the flues to the smoke-stack. Slabs, sawdust, shavings and bark are used for fuel.

The building is 245 feet long by 40 feet wide; and two stories in hight, beside the attic, 24 feet in width, running the length of the building. About 4,000 feet of 1-inch gas pipe is used in heating the rooms required to be warmed, which are supplied through a one-and-a-half inch globe valve, attached to the dome. From one-half to one-and-a-half turns of the valve supplies sufficient steam. One foot of 1-inch pipe is required for 30 or 33 cubic feet of space. The building is sheathed and sided outside, and sheathed inside.

The power is applied through an engine of 16-inch bore, 20 inch stroke, and makes 150 revolutions per minute, with an average pressure of 70 lbs. of steam, cutting off at half the stroke. From the crank shaft are driven a muley saw of 26-inch stroke, running 300 revolutions per minute, and cutting 8,000 feet of logs into boards and plank per day of 11 hours—the bull wheel for hauling in the logs and the main line of shafting 117 feet long.

From the main line are driven one line 78 feet long, one 26 feet, and one 20 feet. Through the medium of these, and several short counter shafts, are driven all the machinery of the factory. The main line is driven by a 16-inch leather belt—now only 15½, having run over 8 years—running over a 6-foot wood pulley on the crank shaft to a 3-foot iron pulley on the main line. The centers of the pulley are 10 feet apart, and the slack part of the belt is horizontal. This gives, calling it a 16-inch belt, 3,690 square feet of belt per minute, which, allowing 80 square feet per minute for horse-power, according to the average result mentioned in the correspondence of J. H. Cooper, on page 4, vol. XIII., gives only 48⅛ horse-power for driving the following machinery, which I think much too little:—

One pair of French burr stones, 3 feet diameter, running 350 revolutions per minute, and grinding 20 bushels corn per hour; one 36-inch circular splitting saw, running 1,080 revolutions per minute; one 30-inch circular splitting saw, running 1,388 revolutions per minute; one 28-inch circular cut-off saw, running 1,300 revolutions per minute; one 24-inch circular cut-off saw, running 1,200 revolutions per minute; one 11-inch cylinder stave saw, running 1,944 revolutions per minute; one 15 inch cylinder stave saw, running 1,620 revolutions per minute; one 19-inch cylinder do. saw, running 1388 revolutions per minute; one 24-inch knife, Woodworth planer, running 3,880 revolutions per minute; five pails and tub lathes, the driving shafts of which run 600 revolutions; one sash sticking machine, running 3,150 revolutions per minute; one tenoning machine, running 3,150 revolutions per minute; one irregular form cutter, running 4,114 revolutions per minute; one Bailey lathe, running 2,500 revolutions per minute; one clothes pin lathe, running 4,000 revolutions per minute; two 14-inch pin, Whittier saw, running 3,240 revolutions per minute; one 10-inch cylinder plane, running 1,920 revolutions per minute; one 4-inch rounder, running 2,400 revolutions per minute; 5 boring machines, running 1,800 to 2,400 revolutions per minute; five saws, 8 to 16 inches in diameter, running 1,800 to 4,000 revolutions per minute; three heading or bottom lathes, running 1,000 to 1,800 revolutions per minute; one engine lathe, one iron plane, grindstone, paint mills, etc.

All the above-named machines are driven at one time by the 16-inch belt, giving employment to 70 or 75 men and boys, and turning off 18 or 20 M. pails and 2,500 to 3,000 tubs and churns per month, beside timber, clothes-pins, broom handles, measures, boys' sleds, etc.

The engine does the work easily. I think it would do more if required. The main belt is pretty tight, but the bearings run cool, and the belt only requires tightening once a year. G. H. Allen.

Two Rivers, Wis., Jan. 8, 1866.

A Word to our Youthful Readers.

Messrs. Editors:—My father takes your paper, and I look over it every week to see if there is anything which I can understand, and very often I do find such, and try experiments. But could you not give us young people a column to ourselves, like some of the other papers my father takes? And would you answer our questions when we are puzzled at home, and my father cannot answer them?

James.

[We have many readers like our young correspondent, who would feel gratified if the Scientific American, in common with other periodicals, had a "Youth's Department," for the instruction and amusement of our young readers—the sons of our mechanics and manufacturers—who are gradually advancing in years and intelligence, until a few more steps place them in the positions which their parents now occupy. To these young friends we sincerely say, that we regret that our limited columns do not at present allow of such a "department," for we feel that information conveyed in a simple and palatable form to the young reader must increase his taste for more substantial and abstruse mechanical instruction, as his mind develops, and truth added to truth gives him a stock in trade to benefit himself and his fellow men in after life. We are all, in many respects, children; and the wisest philosopher feels that he knows but little, and is ever searching after new installments of truth to add to his slight capital.

To a thoughtful observer, the perpetual "why and wherefore" which our children address to us is only a counterpart of the profound investigations of the man of science searching after truth; and, if we study their true interests, we shall try patiently and simply to answer the queries of our children so as to lay a solid foundation for their standing when arrived at maturer years. If we have no other fortune to leave to them, the training they thus receive from us, implanting habits of investigation and close reasoning, will be worth more than a gold mine in California.

Latterly, in answer to one of our correspondents, we stated that "theology was excluded from the columns of the Scientific American;" but, in one sense, we fearlessly assert that each number of our journal adds a fresh chapter in our study of the nature of the great Maker of the Universe, for our duty is to unfold the secrets of His workshop, and Truth is the only key we can use to unlock its mysteries.

While we apologize to our young readers for not giving them a weekly "corner" in our paper, we will endeavor occasionally to interest them with our pen, and gladly welcome any inquiries which may aid them in their search after scientific truth, if they cannot solve them at home.—Eds.

A Question in Relation to Pumps.

Messrs. Editors:—Required, the force, in pounds, to overcome the pressure or weight on the piston of a pump, the diameter of which is 5⅜ inches, the barrel attached to a pipe 1 inch in diameter and 20 feet high.

Also, if area of piston be doubled—other conditions same as above—will double the power be required to operate it? T. H.

Harristown, Jan. 20, 1866.

[A column of water 20 feet in hight exerts a pressure of about 9 pounds to the square inch, and this pressure is the same on each square inch of your piston, whatever the size of your pipe. To get the area of your piston, multiply the square of the diameter by 0·7854.—Eds.

Solvent for Gum Shellac.

Messrs. Editors:—On page 69 of the current volume of the Scientific American, an inquiry is made for a substitute for alcohol to dissolve shellac. Liquor *ammonii caustici* (spirits of hartshorn) will dissolve shellac easily within a few hours. Please find specimen of dissolved shellac in the accompanying bottle. A Subscriber.

New York, Jan. 23, 1866.

[The solution sent is perfect, and as the substance employed to cut the gum evaporates rapidly, it would seem to be as good as alcohol. Our correspondent writes also of a new process for coating iron with copper. The secret seems to be of value, and he should advertise it in this paper.—Eds.

MARKETS FOR THE MONTH.

The most prominent feature in the money market during the past month is the fluctuation in the value of our paper currency, the price of gold, as reckoned in this currency, having fallen from 145¼ to 135, and risen again to 140½. The table below shows the price of staples, as compared with the close of the last month:—

	Price Dec. 27.	Price Jan. 31
Coal (Anth.) ₩ 2,000 lb.	$13 00 @13 50	$12 00 @13 00
Coffee (Java) ₩ lb.	27 @ 28½	27½@ 28¼
Copper (Am. Ingot) ₩ lb.	41½@ 43	37 @ 38½
Cotton (middling) ₩ lb.	51 @ 53	50 @ 51
Flour (State) ₩ bbl.	$7 20 @ 8 75	6 85 @ 8 50
Wheat ₩ bush.	2 25 @ 2 80	2 25 @ 2 80
Hay ₩ 100 lb	75 @ 80	85
Hemp (Am. drs'd) ₩ tun.	325 00@345 00	320 00@330 00
Hides (city slaughter) ₩ lb.	13	12½@ 13
India-rubber ₩ lb.	43 @ 95	70 @ 95
Iron (American pig)	51 00 @52 00	50 00 @51 00
Iron (English and American refined bar)	110 00@115 00	125 00@130 00
Lead (Am.) ₩ 100 lb.	10 00	9 40 @ 9 60
Nails ₩ 100 lb.	8 00 @ 8 25	7 50
Petroleum (crude) ₩ gal.	40½@ 41	32 @ 32½
Beef (mess) ₩ bbl.	11 00 @24 00	16 50 @24 00
Saltpeter ₩ lb.	22	22
Spelter (plates)	10¾@ 0¾	10 @ 11½
Steel (Am. cast) ₩ lb.	13 @ 22	18 @ 22
Sugar (brown) ₩ lb.	11½@ 17½	10½@ 15½
Wool (American Saxony fleece) ₩ lb.	75 @ 77	72 @ 75
Zinc ₩ lb.	15 @ 15½	14 @ 15
Gold	1 45½	1 40½
Interest (loans on call)	6 @ 7	5 @ 6

MISCELLANEOUS SUMMARY.

Mr. J. G. Whitlock, of New York, has recently patented a steam oven for cooking, which is now in use in St. Luke's Hospital, baking bread. Some samples of bread baked in it were shown us. They were thoroughly done, and the exterior had that fine golden tint so much prized by housekeepers. Such an oven has many advantages over one heated in the ordinary way, the temperature being at one point throughout.

Ice Boats.—Ice boats frequently attain a speed of a mile a minute. Recently the *Una* ran from New Hamburgh to Newburgh, a distance of 8 miles, in 7 minutes. An ice boat consists of a pair of sleds forward, and one sled aft, the whole being covered by a frame, so that it looks very much like a flat iron butt end first. The craft is sloop rigged, and steered by the single sled aft. They tack against the wind, as vessels do on the water.

It is reported that the Chilian Government has made overtures to Wm. H. Webb for the purchase of the ram *Dunderberg*. It is said that he will dispose of her if he can obtain the consent of the United States Government. By the terms of his contract, the vessel belongs to him until the money for her is entirely paid by the Government.

California Petroleum.—Mr. W. E. Howell, of Petrolia, Humboldt County, California, has left with us a specimen of crude petroleum from the Noble well at that place. It is very clear, of claret color, and without very disagreeable odor. California is certainly a wonderful country.

Reliable Clocks and Time Pieces.—Parties in want of these articles are referred to the advertisement of John Sherry, in our columns. Mr. S. has furnished some of the best clocks to be found in our country. We have one of his make in our office.

An immense lead vein has been struck near Platteville, Wis., by William Waters and James Roe, the most productive found in the region for 17 years. From 6,000 to 8,000 pounds of mineral are taken out daily.

The nominating committee of the American Institute have presented the name of Horace Greeley as the candidate for President of the Institute.

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NEW INVENTIONS.

Machine for Shelling Peas.—This invention relates to a machine for shelling peas, and is more especially designed for shelling green peas for family use, and also in large quantities for preserving in cans. The invention consists in the employment or use of an endless apron, with a pair of rollers, the apron conveying the peas to the rollers and the latter expelling the peas from the pods. The invention further consists in a vibrating hopper for distributing the peas on the apron, and in a box for receiving the peas as they are forced out from the pods by the rollers. Mellen Bray, of Boston, Mass., and Joseph A. Talpey, of Somerville, Mass., are the inventors, and Wm. K. Lewis, of Boston, Mass., is the assignee.

Pump.—This invention consists in having the portion of a pump cylinder in which the piston works constructed with an inner lining or cylinder of glass, or other substance, having a vitreous inner surface, said inner lining or cylinder being secured within the outer one in a novel way to insure stability and permanency, and all so arranged that the piston is made to work snugly within the cylinder with but little friction. Samuel Vance, of Newburyport, Mass., is the inventor.

Hair Comb.—This invention consists in inserting within or attaching to and upon either one or both sides of a hair comb, and in the direction of its length, between its back or upper edge and the inner ends of its teeth, leaving the said back edge exposed, a strip of metal of sufficient width and thickness to impart stiffness and strength to the material of which the comb is made—whether horn, shell, or any other suitable material—and thus prevent it from warping or springing when used, in consequence of which the ordinary hair combs now soon become broken and unfit to be used. Elias Brown, of Wappinger's Falls, N. Y., is the inventor.

Press for Hay, Cotton, Etc.—This invention relates to that class of presses used for baling hay, cotton, wool, and other analogous substances, in which a heavy drop weight or beater is used, and it consists principally in raising the beater, by the falling of which the hay, cotton, or other material placed in the press is pressed into the form of a bale, by means of hooks so hung at the proper points on endless traveling chains, passing around suitable pulleys at the lower and upper portion of the framing of the press in which the beater moves, that, as such hooks at corresponding points of the endless chains pass around the lower chain wheels, and have commenced and are on their upward movement, they will engage with the beater suitably constructed therefor, and, carrying it along with them, raise or lift it up, when the beater, having reached the desired hight, the chain hooks are then automatically disengaged therefrom, leaving it free to fall with its full weight, and all its force accumulated during such fall, upon the material placed in the press, beating down the same into a compact form; and this invention also consists of an ingenious arrangement of brakes by means of which all recoil is prevented, and the cotton or other substance is held in a compact form while it is being securely bound or strapped. It is claimed by the inventor that the bale, with this press, can be compressed to thirty-three pounds to the cubic foot. Samuel R. Drummer, of No. 105 Beekman street, New York, is the inventor.

Rock Drilling Machine.—This invention relates to a rock-drilling machine in which the drill rod is placed loosely in guides which are secured to a hinged adjustable frame, which is so arranged that it can be brought in an upright or inclined position. On the drill rod is placed loosely a circular flange, and by the action of a suitable tappet on this flange the drill rod is raised and turned, the tappet being made to bear on the flange at such points that by its pressure said flange is caused to bind on the drill rod and to carry the same up, and, at the same time, a revolving motion is imparted to it, causing the drill to strike in different directions. The force of the blow is given by a weight secured to the top end of the drill rod, if the drill frame stands in a perpendicular position, or by a weighted elbow lever if the drill frame stands in an inclined or horizontal position, and the drill frame is pivoted to a table or platform the legs of which can be lengthened or shortened so that the same will accommodate themselves to the surface on which the machine is to be put up. Heinrich Jung, of Port Chester, N. Y., in the inventor.

Mold for Glass.—The object of this invention is, among other things, to produce a better surface for glass molds, to secure an equalization and uniformity in the heat of the mold while the glass is being pressed therein, and to obtain greater facility in handling the mold. The improvement consists, among other things, in casting the mold round a cast-iron chill, instead of round a sand core, as in the ordinary way, which secures a uniform density in the body of the mold, and produces a surface fully equal if not superior to cast steel, while it does not prevent the use of ordinary tools in finishing the inside of the mold. It also consists in the shape given to the mold, which is made of increased thickness in the center in order to secure the equalization of heat throughout its mass while the glass is being pressed. This equalization and uniformity in heat, together with the smoothness of surface produced inside the mold by the use of the iron chill in casting, prevent the glass from sticking as it does in molds now in use. It consists, further, in attaching the handles to the mold by securing their ends in sockets cast in it, pins being passed through the outsides of the sockets and through the inclosed ends of the handles. This improvement in making the molds is found to work admirably in practice, and to remove or obviate the difficulties usually met with in using molds made in the ordinary ways, while a better surface is given to the glass. Michael Sweeney, James E. Mathews, and Thomas Hartley, of Wheeling, West Va., are the inventors.

Governor and Stop Valve.—This invention relates to a steam valve which can be used with equal advantage as a stop valve or as a governor valve. The valve is made in the form of a hollow cylinder provided with an annular port, and fitted into a cylindrical seat with annular steam channel, which communicates with the aperture leading to the steam supply pipe, in such a manner that when either of the solid parts of the cylindrical valve is opposite the steam channel the supply of steam is stopped, but if the valve is raised or lowered so that its annular port corresponds wholly or partially with the steam channel in the seat, the steam passes from the supply pipe to the cylinder or other device, and in whatever position the valve may be brought it is perfectly balanced, and works just as free under a heavy head of steam as it does in the open atmosphere. A. P. and B. F. Lanterman, Prairie City, Ill., are the inventors.

Treating Fur, Wool, Etc.—The fine hair of certain animals, known by the names of fur, wool, and hair, contains, in its natural state, more or less oil and grease, or "yolk," which must be removed in order to bring it to a proper condition for felting, as in making hat bodies or other articles produced by felting, and, also, for other manufactures. This natural grease has been removed heretofore from fur by a treatment called "carroting," in which the fur is subjected to the action of alkalies or acids, and sometimes of quicksilver. Whatever agents were employed, the result often was that the stock was injured, especially for felting purposes, and besides this, the health of the workmen suffered from the vapors arising from the stock, as in the work of finishing hats. The treatment to which wool has been generally subjected has also been found injurious, both when prepared for felting and for spinning. In this new process, the inventor subjects fur, wool, or hair, to the action of saturated steam in a closed vessel, that is to say, in a vessel where any desired pressure may be brought upon the stock placed in it, from the pressure of the atmosphere up to several hundred pounds, according to the character and condition of the stock, for a period of thirty minutes, more or less. The grease or yolk and other matters separated from the stock, runs off with the water of condensation, the vessel having a false or inner perforated bottom, which supports the stock and allows the grease and other matters to run off. Fur, wool, and hair are brought, by this process, to a clean and sweet condition without discoloring them or impairing their felting properties or injuring the strength of their fibers, and are left, besides, in the best possible condition for dyeing, the stock being better adapted for receiving and retaining coloring matter than when prepared under any of the processes heretofore employed. Wool, when treated by this new process, is easily opened and cleaned from burrs and other obstinate and refractory foreign matters. This invention was patented January 23, 1866, by Alfred C. Brush, of Darien, Conn., also of 27 Park Place, New York City, and the claim of this patent was published in last week's list.

Furnace Grate.—This invention relates to the mode of hanging the bars of a furnace grate. They are hung loosely upon a rod passing through them, their ends resting upon the grate frame without being fastened thereto, whereby a free expansion of the bars from their centers to their ends can take place. Each bar is free and independent of the rest, and can quickly be removed and its place supplied with a new one when occasion requires. The bars can be made thin and light, so that the heat is disposed equally throughout the bar, consequently the bar will not be likely to warp. The grate is particularly adapted for use in steam fire engines; it can be so hung as to be tipped instantly, if desired, in case of accident. The inventor, Mr. Charles Whittier, of the firm of Campbell, Whittier & Co., Roxbury, Mass., informs us that the grate has been in successful operation for a year past, and has, by practical test, proved the invention to be a very valuable improvement. The patent was issued January 23, 1866.

Machines for Hulling Cotton and other Seeds. The object of this invention is to improve the methods and machines heretofore used for removing the hulls and skins from cotton and other seeds, so as to preserve the kernel from being crushed and broken in the process. It consists, among other things, in the construction and manner of arranging the knives, which act on the hulls and remove them from the body of the seed. The machine or mill has an upper and an under series of knives set in horizontal beds, one of which is revolved while the other remains stationary. The knives consist of thin blades or pieces of steel plate or sheet steel secured between metallic segments, which are adjustable in lines that converge toward the centers of their beds, so as to hold the blades firmly. The seed to be cleaned and hulled is fed centrally through the upper bed, which has a central opening through it for that purpose. In order to obtain in the greatest possible degree the oils and nutritious matters which exist in the seeds of the cotton plant and other oleaginous seeds, it is necessary to remove the hulls before putting them into the press, both for the purpose of getting out the oils in a pure state, and of keeping the farinaceous part of the seed from being injured and deteriorated by the presence of the hulls and of foreign matters, such farinaceous part being useful as food for stock. John B. Ruperts, of Jersey City, N. J., is the inventor.

TESTING BAROMETERS.—For testing barometers, sent for verification to the Kew Observatory, an iron air-tight box is provided, of sufficient length to contain barometers, and fitted with glass in front and back, so that the mercurial columns and scales of the inclosed barometers may be easily seen. A standard barometer is fixed within, and the barometers to be tested are suspended by its side. By a pump the air is exhausted, thereby the pressure upon the mercurial columns is diminished, and, by comparison with the standard, the corrections at each half-inch of their scales is ascertained. Thermometers are tested by comparisons with a standard instrument under similar circumstances of temperature—heated and cooled water being commonly used for the purpose.

THE human body falls asleep by degrees, according to M. Cabinis, a French physiologist. The muscles of the legs and arms loose their power before those which support the head, and these last sooner than the muscles which support the back; and he illustrates this by the cases of persons who sleep on horseback or while they are standing or walking. He conceives that sense of light sleeps first, then the sense of taste, next smell, and, lastly, that of touch.

THE Nevada papers say that the remains of a "fossil man" have been discovered in that territory, and doctors estimate the hight of the biped at from 10½ to 12 feet.

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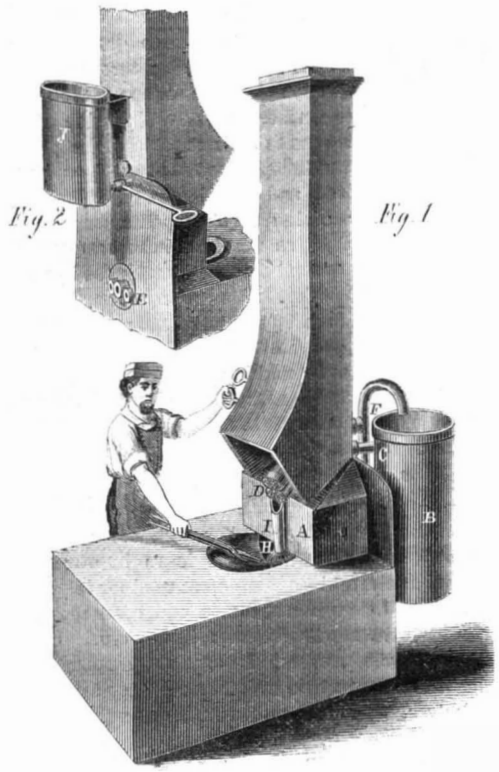
GOULD'S MIST FORGE.

It is a customary practice of the blacksmith to occasionally dash water upon his fire for the purpose of checking the blaze; thus rendering it more agreeable for him to adjust the iron properly in the fire



while heating. It has recently been discovered that a protracted application of the water in the form of a mist, or fine sprinkle, accomplishes this object more thoroughly, and is attended with a great saving of time and fuel.

The forge here shown applies the water in this manner itself, at the will of the smith. By simply turning a handle, H, fine streams are made to issue from a sprinkler over the fire; thus, with ease and certainty, the blaze and surface heat are reduced as desired.

This forge is constructed in the usual form, provided with a waterback, A, tank, B, and escape-pipe, F, all arranged in the usual manner, except that the escape-pipe, F, is attached to the waterback a little lower down, and the upper end extends higher up than usual. To this common and well-known arrangement of the forge, are added pipes, C and P, which are in communication with the tank, B, and escape-pipe, F (see Fig. 1), said pipes, passing through openings in the back wall of the flue, connect with sprinklers shown at D, and are also provided with stopcocks at a point near the outside of the flue, governed by handles, H, the smith being shown in the act of turning one of them. The operation is as follows:—

When there is a pressure of steam in the waterback, the water in it is forced up the escape-pipe, F, and out through the pipe, P, into the sprinkler and over the fire, when the cock governed by the handle, H, is open. When it is closed, the water passes on up the escape-pipe, F, and falls back into the tank, B. Before steam is generated in the waterback, the fire may be sprinkled in like manner by turning the handle of the other stopcock, when water from the tank, B, will be forced out through pipe, C, into the other sprinkler. Thus, it will be seen that the fire can be reduced, the surface fuel kept partially unignited, and radiation effectually prevented, whereby a glowing heat is obtained in the center of the fire.

To secure these results without the use of a waterback, a common dry tweer is used, the front end of one being shown at, H; the blast enters this through the orifice, I, Fig. 2, and the pipe, S, being fitted down upon the top of it, allows water from the sprinkler to trickle down on it, and thus prevent it from burning out, giving it the advantages of the water tweer. With this combination, the tank, K, Fig. 2, is used, being attached to the flue, in any ordinary manner, at an elevation of twenty inches above the forge; the pipe and sprinkler being attached to it near the bottom, pass through the flue, and are operated, as heretofore shown—the water being forced out through the sprinkler by the pressure of water in the tank above it when the cock is opened.

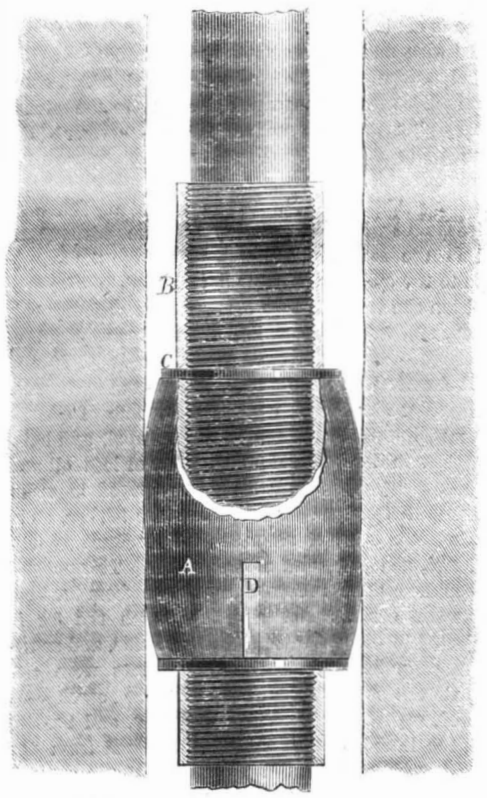
It is asserted that, with this arrangement, by its regular and steady action, heats on heavy work are taken in one-third less time, and the same amount of work done with three-fourths of the fuel required by the common forge. It can also be used without charring the coal, and the fine dust, and small cinders, which are forced by the blast over everything in the vicinity of the forge, or else carried up the flues and out on the roof of the building, are entirely confined by the use of this sprinkler, rendering the business much healthier and the shop more agreeable to work in.

A patent on this forge has been recently secured, through the Scientific American Patent Agency, by J. H. Gould, of Cincinnati, Ohio, to whom further inquiries should be addressed.

FOWLER & MORGAN'S PACKING FOR OIL WELLS.

This engraving represents a new plan for packing oil-well tubes. It can be easily removed at any time without injury, and is claimed to be much more effective than the seed bag commonly used.

In construction it is a cylinder, A, of any elastic substance not affected by oil, placed between two washers about the well tube. The cylinder is slightly smaller than the bore of the well, and is easily let down therein, but on reaching its position it is compressed by screwing the tube itself down into a long coupling, B; this action forces the washer, C, against the packing, and squeezes it out so as to fill the passage completely. The packing rests at the bottom



on a fixed washer, and has also four ribs, D, to hold it from turning while the tube is screwed up. It will be seen that the thread is not exposed at any point, and that the article is likely to prove a success.

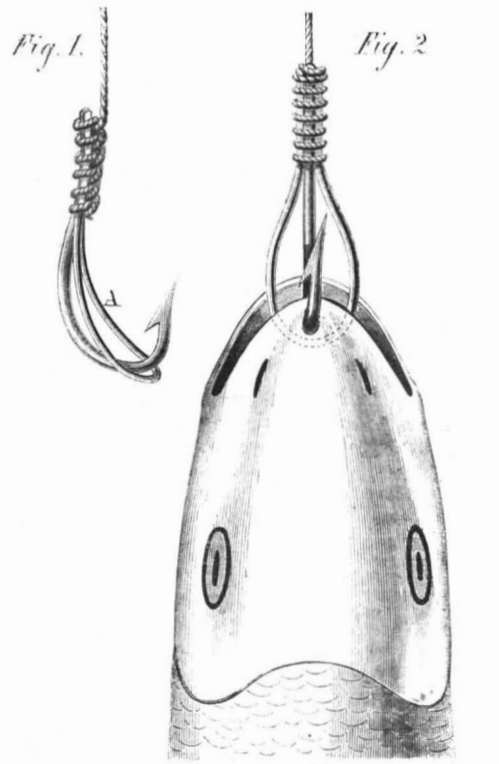
This invention was patented on Nov. 28, 1865, through the Scientific American Patent Agency, by A. H. Fowler and E. J. Morgan; for further information address A. H. Fowler, at Ithaca, N. Y.

Sun Photographs.

Further progress is making at Kew Observatory, near London, with observations of the sun. The process is, in every clear day, to get what are called "solar autographs," that is, photographs of the great luminary. By this means, a systematic record is kept up of all the visible changes that take place on the surface of the sun, the form and motion of spots, variations of brightness, etc., and from this record scientific observers have already drawn conclusions as to the physical constitution of the sun. The question is one of the most interesting in cosmical science.

LIVERMORE'S FISHHOOK.

The ordinary fishhook is apt to be taken in the fish's mouth sidewise, so that it fails to catch on being drawn up when a bite is felt. The object of this invention is to render the hook certain in action, so

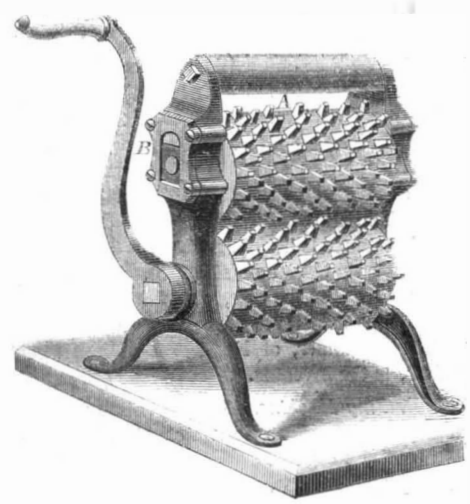


that it always remains point upward, or downward, in a position to hold.

The engraving shows the invention very clearly. It is merely a wire guard, A, slipped over the shank and held by the line; the guard stands at right angles with the hook, and, therefore, compels the same to stand across the mouth when in the act of biting. For this reason, the inventor claims great superiority over the common hook, and asserts that it is practically infallible in its operation. It was patented through the Scientific American Patent Agency, Nov. 18, 1865, by Dr. H. B. Livermore; address him for further information at Ashland, Pa.

DOYLE'S BEEFSTEAK CRUSHER.

This utensil is designed to improve the quality of tough beefsteak, by softening or dividing the obstinate sinews and tendons, so that they become fit



for human food. The machine consists of a pair of spiked cast-iron rollers, A. One of these is set in a pair of boxes, B, said box being fitted with a piece of rubber above, between it and the frame, so as to modify the action of the rollers and prevent them from tearing the beef into shreds and rendering it unsightly. This elastic bearing, also, allows bones to pass through without breaking the teeth of the machine, and a thin or a thick steak to be operated on alike, for the resistance of the rollers is modified by the tension of the spring. The lower roller is operated by the handle, as shown. This invention was patented through the Scientific American Patent Agency, on November 14, 1865, by J. J. Doyle; for further information address him at Sharon, Conn.

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Contents:

(Illustrations are indicated by an asterisk.)

*Leavitt's Condensing and Molding Mill.....95
The Physics of Absorption.....95
Some Steps in Engineering Progress.....96
Health and How to Keep It.....96
Discipline of the Workshop.....96
Polytechnic Association of the American Institute.....97
Lighting up of the Capitol Dome.....97
Ink Prints from Photographs.97
New Publications.....97
No-Ink Pen Swindle.....97
*Carvalho's Apparatus for Superheating Steam.....98
The Weight of Hay in Mows.98
*The Foot Lathe.....99
*Koch's Boring Tool.....99
Power Required to Drive Machinery.....100
A Word to our Youthful Readers.....103
A Question in Relation to Pumps.....100
Solvent for Gum Shellac.....100
Markets for the Month.....100
Miscellaneous Summary.....100
New Inventions.....101
Gould's Mist Forge.....102
*Fowler & Morgan's Packing for Oil Wells.....102
Sun Photographs.....102
*Livermore's Fishhook.....102
*Doyle's Beefsteak Crusher.102
Hours of Labor in English Factories.....103
One Thing About Heat.....103
Probable Adoption by the Present Congress of the French System of Weights and Measures.....103
The Theoretical and Actual Power of a Pound of Coal..03
Report of the Internal Revenue Commission.....1 3
Death of Dr. Nott.....104
Patent Claims...101, 105, 106, 107
Notes and Queries.....107
*Furlong's Screw Wrench.....110
*Stafford's Lock.....110
Something About Bolts.....110

HOURS OF LABOR IN ENGLISH FACTORIES.

The abuses practiced in England, with respect to the employment of children of tender age, are so flagrant that philanthropic men and women are continually protesting against it, and endeavoring to effect reform.

It appears that the evils complained of, relate to overwork in filthy, ill-ventilated rooms, to promiscuous mingling of the sexes under conditions subversive of morality, to employment at unwholesome trades without proper sanitary precautions, and to general decay of both mental and physical power, a natural and inevitable result of the circumstances.

If further appears that these lamentable evils are not wholly the fault of the masters, or factory proprietors. The parents of these children are the guilty parties, putting them to work at the earliest possible age, and extorting the utmost labor they are capable of giving. Carelessness, or cupidity of the workmen themselves, is also a cause of premature death and unnecessary suffering. The fork grinders of Sheffield, for example, suffer greatly from the impalpable dust of steel and stone that fills the air; a preventive is known but seldom used. This is an exhaust fan, which creates a circulation or current, by which this noxious substance is carried away. Instead, however, of providing these fans as part and parcel of the machinery of the factory, the owners compel the workmen to furnish them, arguing that as they are the only ones benefitted, the expense should be borne by them. The consequence is that but few are in use, and those are of little benefit in a large room.

Artificial flower making is one of the most unwholesome occupations, not only from the long hours but also from exhalations, or rather the dry dust set free from the coloring matter. This is constantly floating in the air and irritating the lungs. In England and Wales, there are 10,797 persons engaged in this business, nearly all of them females. The irregular way in which it is carried on, together with the confinement, and the strain upon the attention of the young is very great. Much of the labor is done by gas light, and the trade itself is dirty beyond belief.

In glass manufacturing, the boys who enter the kilns have to bear a heat of 120°. In sheet glass factories the "shovel holders" stand in a temperature of 130°. Instances are given where children, of from 9 to 14 years, have worked 60 hours on a stretch, with but 8 hours' intermission, and we observe that in the boot and shoe trade there are plenty of youths who work 16 hours a day.

Such a condition of things may truly excite the alarm of the thoughtful. Of all God's blessings the most indispensable is light and air, and to the enjoyment of life beyond mere existence. Education is necessary. The unfortunate children above mentioned have no chance to learn anything, not even the alphabet, and as for their future state and spiritual welfare, they are as untaught as the beasts of the field.

No such abuses are practiced in this country to our knowledge, though it is but a few years since the 14-hour system was abrogated by law, and eleven hours adopted as a proper length of time to work; and this time is shortened one hour in a large proportion of the shops in the country.

ONE THING ABOUT HEAT.

Investigations of heat produced by combustion have led to the conclusion that the quantity of heat generated by the burning of any substance is in direct proportion to the quantity of oxygen with which the substance combines in burning. It has been well understood that, in applying this law, allowance must be made for any change of state from the solid or liquid to the gaseous form, either by the burning body or by the oxygen, as in such change a large quantity of heat is absorbed and made latent. It seems to us that the behavior of gunpowder in burning shows that the law is also modified by the varying force of chemical affinities.

When the ingredients are mixed in the proper proportions, gunpowder is composed of one equivalent of nitrate of potassa, KO, NO_5, three equivalents of carbon, and one of sulphur. In burning, the oxygen leaves both the potassium and the nitrogen of the nitrate of potassa, and combines with the carbon, forming carbonic acid; the nitrogen is set free; and the sulphur combines with the potassium to form sulphide of potassium.

KO NO_5	+	3 C	+	S	=
Nitrate of potassium.		Carbon,		Sulphur.	
K S	+	3 CO_2	+	N	
Sulphide of potassium.		Carbonic acid.		Nitrogen.	

A great deal of heat is developed by the burning of the carbon—by the combination of oxygen with it. But this oxygen was already in combination with the nitrogen and potassium of the saltpeter before the combustion, and it is a maxim of physics that just as much heat is absorbed in the decomposition of a chemical compound as is generated by the combination of its elements. If, therefore, a given quantity of oxygen would generate as much heat in combining with nitrogen as it does in combining with carbon, there ought to be no heat generated in the combustion of gunpowder. Is there any way to account for the heat actually generated except by the explanation that the affinity of oxygen for nitrogen is very feeble, while for carbon it is very strong, and that the heat generated by oxygen in combining with either of these elements is in proportion to the strength of the affinities?

PROBABLE ADOPTION BY THE PRESENT CONGRESS OF THE FRENCH SYSTEM OF WEIGHTS AND MEASURES.

The last monthly report of the Agricultural Department has an exceedingly able article on the French system of weights and measures, in which the opinion is expressed that a law will be passed, by the present Congress, making this the only legal system of the country, but allowing eighteen months or two years preparation for the change.

It takes a man or child from five to fifteen minutes to learn this system thoroughly, and we have no doubt if every Member of Congress would devote the very little effort that is required to master the system, it would be immediately adopted by an almost unanimous vote, and that a much shorter delay than eighteen months would be allowed before it should go into operation. It could be taught in all the public schools in a single day, and the adults among our people—nearly all the graduates of public schools or of higher seminaries—could learn it as easily in a week as they could in eighteen months, or in eighteen years.

What is there of it to learn? Simply four units—the unit of length, the unit of weight, the unit of capacity, and the unit of area. The unit of length is the meter, a little more than a yard, about 39⅓ inches; the unit of weight is the gram, about 15½ grains; the unit of capacity is the litre, about 1¾ pints; and the unit of surface is the are, equal to 100 square meters. Besides a knowledge of these units, it is only necessary to know that the system is decimal, like that of our money. The other quantities are obtained by multiplying or dividing these units by 10, 100, 1,000, or 10,000. A length of 10 meters is called a decameter; a length of 100, a hectometer; a length of 1000, a kilometer; and a length of 10,000, a myriameter. The multiplies of the other units are expressed by the same prefixes; for instance, a weight of 10 grams is called a decagram; of 100, a hectogram; of 1000, a kilogram; and of 10,000 a myriagram. It will be seen that these prefixes for the multiples are taken from the Greek numerals; those for the fractions of the units are derived from the latin numerals; for instance, a tenth of a meter is called a decimeter; of a hundreth a centimeter; a thousandth a millimeter.

A child will master the whole system in very little more time than is required to commit to memory the table of avoirdupois weights. Let Congress pass an act declaring that, after the first of January, 1867, the French system of weights and measures shall be the legal system of the country, in one month it will be thoroughly taught to all the children in our public schools—every newspaper in the country will publish it—long before the year expires our people will be thoroughly prepared for it—and before the expiration of another year, there will be a general expression of wonder that we endured the enormous labor and inconvenience of our old complicated and incongruous system so long as we did.

THE THEORETICAL AND ACTUAL POWER OF A POUND OF COAL.

The best anthracite coal contains 98 per cent of carbon. Favre and Silberman found that if all the heat is utilized, one pound of carbon in burning will generate sufficient heat to raise the temperature of 8,080 pounds of water one degree of the centigrade scale; and, according to Andrews, it will heat 7,900 pounds one degree. Taking the smaller of these results, 7,900 pounds, and reducing it, we find that one pound of carbon will raise the temperature of 14,220 pounds of water one degree of Fahrenheit's scale. Multiplying this by Joule's equivalent, 772, and we have 10,977,840 foot-pounds as the quantity of work which one pound of carbon will perform. If we suppose it burned at the rate of one pound per hour, by dividing the foot-pounds of work by 33,000 and by 60, we shall have the horse-power 5⅓. If all its heat could be utilized, therefore, we should have a horse-power from $\frac{3}{16}$ths of a pound of coal per hour. This point is worth remembering—that theoretically we should have a horse-power from two-elevenths of a pound of coal per hour.

The very best engines give a horse-power from about two pounds of coal per hour, and it is a good engine that produces a horse-power from four pounds of coal per hour. An engine that gives a horse-power with two pounds of coal per hour utilizes in work about nine per cent of the whole power of the coal; and one that yields a horse-power for four pounds of coal per hour, utilizes about four and a half per cent of the power of the coal.

REPORT OF THE INTERNAL REVENUE COMMISSION.

The report of the Commission, appointed by Secretary McCulloch, consisting of David A. Wells, Stephen Colwell and S. S. Hayes, to examine our internal revenue system and suggest improvements in it, has just been made public. It sets forth that an examination of the revenue systems of the leading nations of Europe, as well as of this country, disclose the important fact that when taxes are levied on a great number of articles the revenue is mainly derived from a very few. This has led the Government of Great Britain to adopt the policy of abolishing the tax on the great multitude of articles which yield very little, and to confine it to the few which are most productive; thus diminishing the expense of collecting the tax and the burden and annoyance of its pay-

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ment. The Commission recommend the same policy for this country. They advise the abolition of the tax on all the multifarious manufactures of the country, and the raising of the whole revenue from the following sources, which they estimate will yield at least $367,000,000 for the fiscal year ending June 30, 1867, as follows:—

From customs		$130,000,000
From excise, viz.:—		
Distilled spirits	$40,000,000	
Fermented liquors	5,000,000	
Tobacco and its manufactures	18,000,000	
Cotton (raw)	40,000,000	
Coal oil, refined petroleum, etc	3,000,000	
Spirits of turpentine and rosin	2,000,000	—108,000,000
Licenses	15,000,000	
Incomes	40,000,000	
Salaries	2,000,000	
Banks	15,000,000	
Stamps	20,000,000	
Gross receipts	9,000,000	
Sales	4,000,000	
Legacies and successions	3,000,000	—108,000,000
Miscellaneous receipts, 1866-67		21,000,000
Aggregate		$367,000,000

It will be seen from this schedule that manufactures generally are to be exempt from direct taxation.

They say:—

"Accepting, then, the results indicated as substantially correct, the possibility of adopting and carrying out the revenue policy advocated by the commission, viz.: of concentrating the sources of revenue, and of relieving industry of those burdens which tend to check its development, is demonstrated.

"Such a system—which in contrast with the present 'diffused' system, may be termed the 'concrete'—is, in the opinion of the Commission, the only one adapted to the age and to our condition—the only one compatible with great fiscal results, and with that large freedom to industry and circulation which alone can ever adequately supply the coffers of an enterprising, competitive and free people.

"Concentrated taxes can be easily, cheaply and surely collected, and distribute themselves with a satisfying equality; for it is to be remembered that a tax on one of the necessaries of life is, in effect, a tax upon all, without the vexations of infinitesimal application.

"The oil operators find that one well, intelligently sunk in the right spot, will drain the whole basin better than many, with less expense, and no disturbance of the surrounding country. In like manner, we must draw our revenue from few sources, and avoid the error of many and useless perforations."

In regard to incomes they recommend an exemption to the extent of $1,000, an abolition of the allowance for house rent, and an equalization of the rates on the incomes of over $5,000. They propose to set apart $50,000,000 annually for the payment of the public debt.

DEATH OF DR. NOTT.

The Rev. Eliphalet Nott, D.D., LL.D., the venerable President of Union College, Schenectady, died at that place on the 29th of January, in the ninety-third year of his age. He was born at Ashford, Windham Co., Conn. June 25, 1773, and after studying divinity, he was sent out at the age of 21 as a domestic missionary, to the center of New York, which was then a newly-settled region. In 1804 he was chosen President of Union College, and filled the place till the time of his death—a period of 62 years. The college when he was chosen President had only forty students, and was without funds; he left it very richly endowed, and one of the most flourishing of all our institutions of learning.

Dr. Nott was a very fertile and successful inventor. He obtained more than thirty patents, most of them for applications of heat to steam engines and other purposes. His famous stove was designed to effect complete combustion of the fuel, and to secure the distribution of nearly all the heat generated into the atmosphere of the room, by obstructing the escape of the products of combustion, and by a large area of radiating surface. His management of his patents, and the shrewd conduct of his business generally, proved so profitable, that he was enabled not only to build up one of the largest steam-engine manufactories in the country—the Novelty Iron Works, in this city—but also to endow his college with the magnificent sum of $400,000.

He was a self-educated man, and made his mark in the world by the force of his own character. He was of commanding presence, and always exerted great influence over those with whom he came in contact. After a very long, active and useful life, he has—

"... Full of years and ripe in wisdom, laid
His silver temples in their last repose."

ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING JANUARY 30, 1866.
Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

52,255.—Metallic Hub for Vehicles.—Joseph Abbott, Washington, Ind.:

First, I claim the two part body, C, provided with lips, d d', to form mortises and employed in combination with the pipe, A, shoulder, B, and screw cap, D, as and for the purposes specified.

I also claim the oil cup, E, provided with a faucet, F, and communicating with the interior of the pipe or box, A, substantially as and for the purpose set forth.

I further claim the recess, h, in the pipe or box, A, when used in combination with the oil cup, E, and faucet, F, substantially as and for the purpose specified.

52,256.—Knitting Machine Needle.—J. M. Armour, Craftsbury, Vt.

First, I claim the needle provided with the hook, a, in combination with the pivoted stitch holder, b, having its front end arranged to lay in the recess in the shank of the needle when depressed, and to come flush with the upper surface of the hook, a, when raised, as shown in Fig. 3.

Second, The combination with the needle, and the pivoted stitch holder, b, as above described, I claim the spring, c, to operate the latter as shown and described.

I claim operating the needle and stitch holder, by arranging them to move or slide longitudinally, and having the latter impinge against a cam or fixed piece, as shown in Figs. 2 and 3, as herein described.

52,257.—Mode of Attaching Castors to Furniture.—W. B. Bartram, Norwalk, Conn.:

I claim applying rollers or castors to the feet of furniture legs, so that the said rollers or castors shall not touch the floor while the article of furniture is standing with the feet of all its legs thereon, but only when one side or end is raised as described.

25,258.—Breech-loading Fire-arms.—Fordyce Beals, New Haven, Conn.:

I claim withdrawing a cartridge or spent shell by means of the hammer, constructed substantially as specified.

52,259.—Water Wheel.—Martin Bell, Sabbath Rest, Pa.:

I claim a water wheel provided with buckets arranged or connected in pairs so as to move or slide in a direction transverse with the wheel shaft, in combination with friction rollers and cams or their equivalents for operating or sliding the buckets, and an apron which partially encompasses the wheel, substantially as set forth.

[This invention consists in providing a water wheel with moving or sliding buckets and partially encompassing the former with an apron, the vents being constructed and arranged in such a manner that the buckets will effectually prevent the water passing through the wheel without acting upon them, the buckets being in one sense like gates, and not allowing the water to escape unless the wheel turns.]

52,260.—Reach for Lumber Wagons.—George and William Bench, Auburn, N. Y.:

I claim the combination and arrangement of the short reach, B, with subreach, C, socket, F, and loop, G, constructed substantially as described and for the purpose set forth.

52,261.—Machine for Making Pottery Ware.—Horatio R. Bodine, Falls Township, Ohio:

I claim the mode of pressing clay into the forms of vessels which mode consists in the application of the toggle-joint power and the removing of the clay from under the plunger by a movable bottom projecting up in the mold.

I also claim the mode of freeing the piece from the plunger by moving a wire and cutters around the plunger.

52,262.—Comb.—Elias Brown, Wappingers' Falls, N. Y.:

I claim as a new article of manufacture, a comb made with metallic strengthening strips inserted in grooves in the sides of the comb, substantially as described and represented.

52,263.—Broom Head.—Henry Buck, Harrisburg, Pa.:

I claim the combination with the socket, B, of the elastic arms, D D, and clamping bars, F F, when said bars are arranged so as to project below the socket, as and for the purpose specified.

52,264.—Harvesting Machine.—Wm. H. Burkhart, Bucyrus, Ohio:

First, I claim pivoting the ends of the rectangular finger-beam, brace, C, to the frame of the machine, substantially in the manner shown and described, so that the axes of motion of these ends, or pivots will coincide with each other, and admit of the finger beam being elevated or depressed bodily.

Second, The concave guard, d, constructed with the oblique bearing, d', and formed upon the front part of the frame, A, in combination with the brace or coupling, C, constructed with an oblique journal to work in bearing, d', substantially as described.

Third, The construction of the frame, A, in the manner represented in Fig. 5, and as herein described for the purpose set forth.

Fourth, The construction of the brace or coupling arm, C C, as represented in Fig. 4, and as herein described for the purpose set forth.

52,265.—Washing Machine.—George G. Campbell, Janesville, Wis.:

I claim the combination of the corrugated bottom, R, and rotary rubber or presser, M, when the latter is constructed with the radial or parallel bars, O, and joint, N, and operated by the vibrating segmental geared lever, F, substantially as and for the purpose set forth.

52,266.—Flour Sifter and Measure.—George G. Carver, Roxbury, Mass.:

I claim a sliding scale to indicate the quality of flour as described in combination with a flour sifter.

52,267.—Earth Borer.—Melvin C. Chamberlin, Warsaw, N. Y.:

I claim the combination of the shaft, B, the knife, C C, together with the hollow cylinder, A, constructed and used as and for the purpose herein set forth.

52,268.—Churns.—Nathan Chapman, Milford, Mass.:

I claim a horizontal dash shaft, hollow with hollow paddles open at their outer ends, and communicating with the hole in the shaft in combination with a cup or tube at the end of the shaft to supply air to the shaft and paddles when the churn is in operation as described.

52,269.—Bottle Stopper.—Richard S. Connelly, Johnsonville, N. Y.:

First, I claim forming within the neck of a bottle, can, jar, jug, or other similar articles, a screw socket or opening having a portion of the same, either above or below the screw-thread, made of a smooth conical shape, substantially as herein described and for the purpose specified.

Second, A stopper made of wood or any other suitable material having a corresponding shape to the screw socket, formed in the bottle, jar, can, jug, or other similar article, substantially as and for the purpose specified.

Third, Capping or covering the conical portion of the stopper or covering the corresponding part of the screw socket with india rubber, tin-foil or other suitable elastic or flexible material, substantially as and for the purpose described.

Fourth, The combination of a screw-stopper having the general shape and form, and either with or without a yielding cap-piece or covering, with a corresponding shaped screw socket on the neck of the bottle, can, jar, or other similar article, substantially as and for the purpose herein above set forth.

[This invention relates to stopples used for bottles, jars, etc., in which liquids or other materials are kept, from which it is necessary that the air should be entirely excluded, and consists in the use of a screw-stopper made of wood or other suitable material, one portion of which stopple is made of a conical or tapering shape in combination with a screw socket neck having a corresponding portion of the same to that of the stopper made of a tapering or conical shape, so that when the stopper is screwed into the same it can come to a perfectly light and close bearing and joint therewith.]

52,270.—Screens for Wool Dryers.—John E. Crane, Lowell, Mass. Antedated Nov. 27th, 1865:

I claim the use of a screen with a wool dryer when the said screen has been manufactured substantially as herein set forth, for the purpose of protecting it from the action of wet or dampness in the wool, and so as to prevent the wool from adhering to the screen.

52,271.—Stump Extractor.—John Crowner, Wellsville, N. Y.:

I claim the right and left hand screw shaft, A, arranged with nuts applied to axles or other moving parts, in connection with rods, chains or other equivalent means to anchor the device and attach or apply the same to the stump, substantially as set forth.

I further claim the drum, G, applied to the screw shaft, A, as shown and having a rope or chain attached to it, for the purpose of communicating motion to the screw shaft by a draft animal.

I further claim the gearing, E J, and support, L, in combination with the drum, G, and screw shaft, A, substantially as and for the purpose specified.

52,272.—Churns.—Jacob Dodder, Washington, Iowa:

I claim the arrangement of the propelling blades, g, and wheel, h, on a vertical shaft and within a vertical or upright churn substantially as herein and for the purposes set forth, and in combination with said blades and wheel, I claim the studs, i, and strips, j, as described.

52,273.—Washing-machine and Churn Power.—W. M. E. P. and Ellis Doty, Ganesville, Wis.:

First, we claim the arrangement of springs, c c', on opposite ends of the fulcrum pins, a, of the presser, substantially as and for the purpose described.

Second, The swivel bar, d, on the top edge of the presser, constructed and operating substantially as and for the purpose set forth.

Third, The described combination with the churn and wash tub of the spring lever frame, D, for the purpose set forth.

[This invention relates to certain improvements in that class of washing machines in which a vibrating presser is used to produce the requisite action on the clothes to be washed. This presser is suspended from pivots, on which it is firmly keyed, and which are subjected to the action of two coiled springs, connected to them on opposite sides of their bearings, and arranged in such a manner that they affect each other's lateral pressure, and consequently relieve the friction on the pins. The handle or frame which serves to operate the presser forms a convenient churn power, which, when attached to a churn dasher, greatly facilitates the operation of the churn.]

52,274.—Cutting Gaiter Boots.—A. D. Drew, Dixon, Ill.:

I claim cutting the gaiter upper in one piece, with lips, one or more, for covering the openings left for convenience in putting on the gaiter, substantially as described and for the purpose set forth.

[This invention is designed to diminish the labor, and consequently the cost of cutting out and making up the uppers for gaiters, and it consists in cutting the upper in one piece, making very little closing necessary in making the gaiter, the gaiter being so formed as to fit the foot closely and at the same time to be easily put on and taken off.]

52,275.—Beater Press.—S. R. Dummer, New York City:

First, I claim providing the sides of the press with openings which admit of the hooks slipping away from the weight, so as to disengage the latter or pass it, as the case may be.

Second, The arrangement of the endless chains or belts, H H, having hooks, L L', and drop weight, G, upon and within a suitable upright box or casing, A, having openings, P and R, at proper points of its sides, against which the chain hooks bear, substantially as herein described, and so as to operate in the manner specified.

Third, So arranging the spring catches, b b, by which the drop weight is held elevated, with regard to any one of the openings in the press box for the escape of the chain hook from the drop, that, when engaged with the weight to retain it in position, the said hooks can freely pass by the weight, thus not necessitating the stopping of the motion of the chains, substantially as described.

Fourth, I claim the arrangement of the mechanism for disengaging the lower pawls, p p, consisting of the cords, t t, connected to the rock shafts, p' p', operated as described.

Fifth, I claim the arrangement of the cords, f f, pulleys, d d, and rock shafts, p'' p'', for the disengagement of the upper pawls, b b, to release the weight, substantially as described and represented.

Sixth, Forming grooves or recesses in the striking surface of the drop weight for receiving the wooden cleats or strips such as are used in the bailing of hay, which grooves are of such depth that the cleats will not project beyond the face of the drop, and have any suitable arrangement of clutches for holding the said cleats therein, substantially as and for the purpose described.

52,276.—Machine for Wiring Blind Slats.—Elijah F. Dannaway, Indianapolis, Ind.:

I claim the arrangement and construction of the devices, E F G M N R and P, when arranged and combined as herein described and for the purposes set forth,

52,277.—Refrigerator and Condenser.—Solomon B. Ellithorpe, New York City:

I claim a refrigerator or condenser for cooling liquors or condens-

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ing vapors, consisting of an outer chamber, B, and an inner chamber, A, and a system of perforated pipes, substantially as herein specified.

52,278.—Scroll Biscuit Machine.—Adam Exton, Trenton, N. J.:

I claim the scroll biscuit machine constructed with creased rolls, and adapted to operate as and for the purpose herein described.

[The object of this invention is to furnish a machine by means of which strips of dough may be creased or figured for making scroll biscuit, and it consists in chaneling or creasing the grooves of the rollers through which are passed the strips of dough from which the biscuit are made.]

52,279.—Hay and Pruning Knife.—John Fasig, West Salem, Ohio:

I claim the combined hay and pruning knife, when constructed and arranged as set forth.

52,280.—Shank Lasters.—Ward N. Flagg, Boylston, Mass.:

I claim the combination with the levers, A A, operated as described, and having points, d d d, at their lower ends, of the long springs, G G, provided with points, e e e, and thumb pieces, H H, as and for the purposes described.

52,281.—Corn Planter.—M. C. Floyd, Bloomfield, Iowa:

First, I claim the combination of the levers, K g', and connecting rod, J, with the hinged frame, A D, the lever, R, being provided with a ratchet, or its equivalent, by which it can be fixed at any desired point, substantially as described.

Second, Supporting the seed-dropping devices upon a frame, D, which is hinged to the main frame, A, and provided with a vertical post, g, in combination with the rod, J, and lever, R, substantially as described.

Third, Providing for dropping the seed automatically by means of a studded wheel, C, acting upon levers, P P', which are connected together by a chain, r, and which are also connected to the vibrating lever, g, substantially as described.

Fourth, Sustaining the vertical post, g', upon the frame, D, by means of the draft pole, H, in combination with the rod, J, and vibrating lever, K, arranged substantially as described.

52,282.—Corn-stalk Cutter and Stripper.—Nelson Gabel, Preble County, Ohio.

I claim the plate, B, in combination with the springs, d d, the plate, c, and the spiral spring, e, the whole constructed and operating as and for the purpose herein set forth.

52,283.—Process for Extracting Oil, Etc., from Minerals.—H. P. Geugembre, Pittsburgh, Pa.:

First, I claim extracting oils, paraffine, or bitumen from minerals containing the same, by submitting said minerals to the action of light liquid hydrocarbon, in a liquid state or in vapor, for the purpose of dissolving the oils, paraffine, or bitumen therein contained.

Second, I claim creating the spent mineral with water or with an aqueous solution of mineral salt or salts, for the purpose of separating the spent mineral from the light liquid hydrocarbon oils, paraffine, or bitumen.

Third, I claim recovering the light liquid hydrocarbon by the process specified, and using it over and over for subsequent operations.

Fourth, I claim the combination of the downward motion of the mineral with the upward motion of the solvent in the vessels, A and C, as described and for the purpose specified.

Fifth, I claim the application of mechanical power to divide the particles of mineral after they have soaked in the solvent, and without taking them out of the same, in the manner specified.

52,284.—Apparatus for Extracting Oil, Etc., from Minerals.—H. P. Geugembre, Pittsburgh, Pa.:

First, I claim the apparatus composed of the vessel, A, vessel, C, or of two vessels or more, A and C, in combination with the still, P, pipes, Y and J, tank, N and X, and furnace, S, and flues, T T, or any modification of the same, working and operating substantially in the manner for the purpose specified.

Second, The vessel, A, crusher, B, vessel, C, fables, b b b, etc., shaft, E, pipe, K, elevator, L, pipe, V, and pipe, I and J, when used for extracting, by means of a solvent, oil, paraffine, or bitumen from minerals containing the same.

Third, The still, P, receiver, N, double-bottom space, Z, filled with an aqueous solution of salt or salts, when combined with the worm, V, tank, X, pipe, Y, vessel, C, vessel, A, pipe, J, and furnace, S, for recovering the solvent used in the operation and graduating the oil, paraffine, or bitumen obtained, to its proper quality.

52,285.—Manner of Attaching Saws to their Handles.—Wm. H. Gillam, Seattle, Washington Territory:

I claim the spring catch, b, and stationary pin f, in combination with the ear, A, of a saw handle, and with notches, d e, in the saw, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the application of a spring catch fitted into a suitable recess in the ear of the handle and dropping into a notch in the back of the saw, in combination with a stationary pin intended to fit into a notch in the front edge of the saw, in such a manner that on introducing the end of the saw into the ear of the handle it is firmly held in position by the combined action of the spring catch and of the stationary pin, and by forcing the spring catch back the saw can easily be released from the handle at any moment.]

52,286.—Balanced Slide Valve.—Virgil D. Green, Watertown, Wis.:

First, I claim the hollow valve, D, provided with ports for conveying steam to the cylinder, and having steam pipes, F F, attached to it, substantially as set forth.

Second, I claim the balance plug, G, in connection with the valve, D, for the purpose of balancing the valve, as herein described.

Third, I claim the valve or balance plug, G, in combination with the set screw, S, sector, B, and spring, Q, or their equivalents, for adjusting the plug, as herein set forth.

Fourth, I claim the arrangement of the brackets, R R, and bridge, K, detachable from the valve for the purpose of adapting the valve to and relieving the steam in the cylinder in reversing engines, and allowing the use of the valve in non-reversing engines.

Fifth, I claim the steam pipes, F F, arranged and operated substantially as set forth.

52,287.—Motive Power.—Jonathan H. Haven, Lewiston, N. Y.:

First, I claim the oscillating frame, B, with the connecting-rod and supporting frame, A, and lever, C, constructed and operating substantially as and for the purpose herein set forth.

Second, I claim the weighted flywheel, H, when used in connection with the above-described oscillating frame, having the gearing and band wheel, constructed and arranged to operate as and for the purpose substantially as described.

52,288.—Bag Holder.—Charles W. Hills and O. F. Woodruff, Morrison, Ill.:

We claim the hinged hoop, D D, cross bar, C, spring catches, H H, and arm, A, constructed, combined, and arranged substantially as herein specified.

52,289.—Machine for Cleaning Cotton.—James E. Hooper, Baltimore, Md.:

I claim the combination of the screens arranged as specified, with a willow for cleaning cotton.

52,290.—Artificial Teeth.—Ezra P. Hoyt, New York City:

I claim a metal base, having a perforated gum ridge, B, and reinforce strips of metal, F and G, in combination with the hard rubber or other vulcanizable gums, and artificial teeth, substantially as described, for the purpose of making sets of artificial teeth.

52,291.—Folding Lunch Box.—C. S. Hurlbut, Springfield, Mass.:

I claim the combination of the bottom plate and folding hinged side, end, and cover plates, which are capable of being laid over the bottom plate, held firmly together by clasps upon one of the cover plates, in the manner and for the purpose herein specified.

[This invention relates to a peculiar manner of constructing a lunch or dinner box, so called, and consists in so attaching the side plates of the box to its bottom plates, and the end plates to its cover—which cover is divided across its width into two parts, hinged at their outer ends to the top edges of the said end plates—that when the box is empty the said side, end, and cover plates can be all folded over and laid down and upon the bottom plate, where they are held firmly together by clasps upon one of the cover pieces or sections, thereby producing a very convenient, compact, and portable box, for the carrying of a lunch or dinner, as when so folded it can be carried with ease in the pocket of the person.]

52,292.—Rock Drill.—Heinrich Jung, Port Chester, N.Y.:

First, I claim the arrangement of the loose flange, G, and tappet, F, applied in such manner as to elevate and rotate the drill simultaneously, in the manner and for the purpose set forth.

Second, The adjustable hinged drill frame, C, arranging the loose drill rod, E, with a loose flange, G, in combination with the weighted elbow lever, H, constructed and operating substantially as and for the purposes set forth.

52,293.—Sheep Shears.—Albert H. Kennedy, Brunswick, Ohio:

I claim the combination and construction of the machine and shears and the application of the power necessary to shear wool from sheep and which will produce the intended effect.

52,294.—Screw-cutting Chuck.—T. Kennedy, Mount Carmel, Conn.:

First, I claim providing for adjusting the screw-cutting dies upon a face plate, A, so that they shall always be tangent to the circumference of the body of the screw which is being cut, substantially as described.

Second, Sustaining and confining screw-cutting dies, c, upon a face plate, A, by means of adjustable segments, C C C' C', applied to said plate, substantially as described.

Third, Pivoting the adjustable segments, C' C', to the ring, h, of the face plate, A, in such manner that the dies may be all adjusted alike, substantially as described.

Fourth, The combination of the adjusting screws, b, with means for adjusting the dies, C, and setting them at any desired tangent, substantially as described.

Fifth, Constructing the screw-cutting dies, C, with beveled sides and beveled ends, substantially as described.

52,295.—Fertilizer Sower.—William H. and John S. Lakin, Lander, Md.:

We claim the reciprocating vertical post, E, with pin, H, which vibrates in a horizontal plane above the aperture, substantially as described and represented.

52,296.—Curtain Fixture.—William A. Lamberson and Thomas O. Morton, New York City:

We claim the roller, A' A, the ferrule, B, the pivot, C, the bracket, I, and the fender, D, when the whole of these parts are made and and arranged in relation to each other, substantially as set forth.

52,297.—Tobacco Pipe.—Gustav Lautenschlager and G. L. Gott, New York City. Antedated Jan. 17, 1866:

We claim a bowl or saliva reservoir for a smoking pipe, made of coal dust mixed with pitch or other suitable cement, and formed substantially as and for the purposes described.

[It is a well known fact that coal of any description, be it animal, vegetable, or mineral, is a superior deodorizing and absorbent agent. Based on this fact is this present invention, which consists in a bowl or saliva reservoir for tobacco pipes, made of coal dust prepared with pitch, rosin, or other suitable cement, and then pressed and formed in suitable molds, or cut out and finally heated to a red heat in a kiln or in an open fire.]

52,298.—Governor for Steam Engines.—A. P. and B. F. Lanterman, Prairie City, Ill.:

First, We claim the combination of the oscillating arm, B, stem, H, constructed as shown, and spring, J, when arranged to operate as and for the purpose herein set forth.

Second, The combination of the stem, H, valve, U, and the adjusting valve stem, i, arranged to operate as described.

Third, The lever, K, connected to the valve stem, substantially as shown, in combination with the adjusting screw, M, arranged and operating as and for the purposes set forth.

52,299.—Gas Stove.—Alexander M. Lesley, New York City, and William Craig, Brooklyn, N. Y.:

First, We claim the combination with a gas stove of a steam generator or boiler, whereby a current or jet of steam is generated and thrown up in contact with a flame of gas, thereby insuring more perfect combustion and greater heat, substantially as described and specified.

Second, We claim combining with a gas stove, constructed with a steam generator substantially as described, a cone, e, or equivalent device, for directing the steam to the flame of gas, substantially as described and for the purposes specified.

Third, We also claim the combination and arrangement of the steam generator, D, cone, c, pipes, b and d, with their connection, and the cylinder, E, constructed and operating substantially as described and specified.

52,300.—Gas Stove.—Alexander M. Lesley, New York City, and William Craig, Brooklyn, N. Y.:

We claim the combination of a current or steam with a flame of illuminating gas and a supply of air, substantially in the manner herein described and specified.

52,301.—Oil for Lubricating Machinery, Etc.—John H. Lester, Brooklyn, N. Y.:

I claim the above described production of an improved mechanical oil for lubricating machinery and other purposes substantially as set forth.

52,302.—Tobacco Pipe.—Robert Livingston, New York City. Antedated Jan. 18, 1866:

I claim, in combination with the stem A, closed as shown, the tube, C, or its equivalent, for the purpose specified.

52,303.—Cotton Picker.—W. D. Ludlow, New York City:

I claim the employment or use for picking cotton, from the bolls in the field, First, The case, A, picking gate, comb, or fingers, D, and strippers, J and K, combined and operating substantially as described.

Second, I claim the sliding picker gate, comb, or fingers, D, as set forth.

Third, I claim the strippers, J and K, as set forth, separate or together.

52,304.—Sawing Machine.—W. G. Lumbard, Georgetown, Ill.:

I claim a sawing machine, constructed, and arranged substantially as described and for the purpose set forth.

52,305.—Hot-air Engine.—Florence McDonough, Middletown, Conn.:

First, I claim the arrangement of the pipe, W, by means of which the inflowing air and outflowing gas, pass alternately through the same passage and over the same surfaces.

Second, I claim the combination of the cylinder and pipe, with the furnace, substantially as described, forming parts of a gas engine.

52,306.—Hand Loom.—C. L. McDowell, Wassonville, Iowa:

First, I claim the specific combination and arrangement of the picker staffs, L L', shaft, G, tappets, I I', picker, O, and flies, S S, when the motion of all these parts is derived from the battens, as herein set forth.

Second, I claim communicating the required motion to the cloth beam, from the batten, by the means described.

[This invention consists in a loom the treadle shaft of which has an intermittent rotary motion revolving round one-fourth, more or less, at a time, and carrying a treadle down for every stroke of the lay or batten. It is provided with four, more or less, cams or tappets, which correspond in number and position to the number and position of the treadles, and which are so arranged that they can be lengthened or shortened in order to increase or decrease the throw of the treadles, or that their position can be changed, if it is desired to move the treadle out of their regular order, or that some of them can be removed when it is desired to decrease the number of treadles to be brought in operation.]

52,307.—Shaft Coupling.—Marvin Mead, Augusta, Mich.

I claim the clip, A, constructed as described, to hold the shank B, said clip being provided with a countersink beneath the end of the shank, in which countersink is placed a piece of india-rubber or other elastic material, which is there held by means of a pin which passes through the clip, substantially as and for the purpose specified.

52,308.—Propeller.—George Meader, Ottawa, Ill.:

I claim the combination with the actuating rods, t t, swinging levers, d d, and paddles, b b, of the universal joints, f, pinion wheels, g, and sliding rack bars, l, arranged and operating in the manner and for the purpose explained.

52,309.—Grain Mower.—William Moss, Buffalo, N. Y.:

First, I claim the employment of a direct blast of compressed air in combination with the portable tube, A, or its equivalent, for conveying and discharging grain, substantially as set forth.

Second, I also claim, in combination with the air nozzle, B, and conductor, A, the flexible hose, H, whereby the apparatus is rendered portable and independent of the engine which supplies the condensed air, substantially as and for the purpose set forth.

Third, I also claim, in combination with the air nozzle, B, and conductor, A, the stop-cock, E, operating in the manner and for the purpose set forth.

Fourth, I claim the T-formed nozzle, G, in combination with the air pipe, B, and hose, H, operating in the manner and for the purpose set forth.

52,310.—Car Brake.—David Myers, Chicago, Ill.:

First, I claim in combination with the spring, D, or its equivalent, the employment of a device for throwing the paw, H, into the rack, I, substantially as specified and shown.

Second, I claim the combination of the springs, D, the rod, F, provided with the head, F', and the bent arm, G, arranged and operating as and for the purpose described.

Third, I claim the combination of said spring, D, rod, F, arm, G, and the pawl, H, arranged and operating as and for the purpose shown and specified.

Fourth, I claim the combination of the wedge, E, with the arm, G, and rod, F', provided with the head, F, arranged and operating as and for the purposes specified.

Fifth, I claim the combination of said wedge, E, with the crank shaft, L, and arm, M, as and for the purposes shown and described.

Sixth, I claim operating the friction wheel for applying the brakes by means of the bell cord, a', or its equivalent, in combination with a spring, operating substantially as specified and shown.

52,311.—Car Brake.—David Myers, Chicago, Ill.:

First I claim the employment of the levers, c c, arranged and operating substantially as and for the purpose herein specified and shown.

Second, I claim the combination of said levers, c c, with the sliding block, B, arranged and operating substantially as and for the purpose shown and described.

52,312.—Car Brake.—David Myers, Chicago, Ill.:

First, I claim the arrangement of the pulleys, H, movable block, G, and the cords, D and F, when operating substantially as and for the purpose set forth.

Second, I claim the plate, E, when constructed and operating as described.

Third, I claim the combination and arrangement of the plate, E, button, d, ratchet wheels, I I', and the movable block, G, when constructed and operating substantially as herein specified.

Fourth, I claim the crooked levers, R, when constructed and operated substantially as set forth.

Fifth, I claim the combination and arrangement of the frame, C, or its equivalent, the sliding pieces, N and O, the springs, U and T, or their equivalents, the levers, R, and devices for operating the sliding pieces, N and O, when all constructed substantially as and for the purpose herein described.

Sixth, I claim the hook, q, ratchet wheel, V, and pawl, p, when arranged and operated substantially as set forth.

Seventh, I claim the combination and arrangement of the lever, W, arm, s, lever, L, bent lever, X, and pawl, p, when constructed and operating substantially as described.

Eighth, I claim the combination and arrangement of the lever, p, cross lever, n, pointed dog, S, and sliding piece, O, when operated substantially as and for the purposes herein specified.

52,313.—Churn.—Moses Neal, Kalamazoo, Mich.:

I claim the vibrating dasher rod, pivoted with beaters so placed that when in contact with the sides they are parallel therewith, in combination with the vessel, A, and breakers, H, the whole constructed and operating substantially as described and represented.

52,314.—Explosive Shell.—Isaac P. Noyes, Providence, R. I.:

I claim a projectile which, with the effective properties of a direct shot, possesses the additional one of being capable of discharging a load of shot from its rear end, either during its flight or after it has struck, said projectile being constructed substantially as herein described and for the purposes set forth.

52,315.—Cement for Leather.—B. F. Pettingill, Newburyport, Mass.:

I claim the combination made of the ingredients, and in the manner, and for the purposes substantially as hereinbefore explained.

52,316.—Lamp.—Danl. L. Pickard, Rochester, N. Y.:

I claim my lamp as fully described and set forth, consisting of a combination of an ordinary reservoir filled with wool as an absorbent, the hinge with m the deflector forming a stop, as set forth, the spring catch regulated by the screw, the wick tube made as set forth, in two sections, to cut off heat, the upper section larger than the lower, with the lower end thereof enlarged for the double purpose of allowing the wick to play easily and of allowing the rising gas to pass into the gas chamber and flame, as set forth, and the chamber, r, to hold the gas and deliver it regularly and not in puffs to the flame the whole combined and arranged as set forth.

52,317.—Mowing Machine.—Robert G. Pike, Middletown, Conn.:

I claim the combination of the drum, c c, pins, n n', steel lever or vibrator, F, spindle or shaft, D E, and lever or finger, G, when arranged in the manner described and employed to operate the cutter bar as set forth.

52,318.—Cotton Feed Planter.—John Price, New Harrisburg, Ohio:

First, I claim the spiked roller in combination with the staples or their equivalents, for feeding the cotton seed into the seed tubes without clogging, substantially in the manner set forth.

Second, I claim the arrangement of the feed box and spiked rollers in combination with the cog wheels and lever, S, substantially as described for the purposes specified.

Third, I claim the combination of the frames, C and E, and the pulleys, J and K, arranged and operated substantially as set forth.

52,319.—Broad-cast Seeder.—George Race, Norwich, N. Y.:

First, I claim a broad-cast seed sower having a rotating and adjustable hopper for the purpose of regulating the quantity of grain to be distributed.

Second, In connection with the rotating hopper, I claim the swing valve when used for the purposes and substantially as described.

Third, In connection with the swing valve I claim the drum with its longitudinal ribs, having cups located alternately, as shown.

Fourth, In connection with the swing valve, I also claim the elevations or inclines upon the longitudinal ribs for the purposes shown and described.

52,320.—Chamber Pot.—Andrew Rankin, New York City:

I claim so constructing a chamber pot as to form a receptacle or receptacles for any suitable deodorizing agent or compound, substantially in the manner described and for the purpose specified.

[This invention relates to a novel construction of a chamber-pot, so-called, the object of which is to so arrange in connection with the same a receptacle or reservoir, for any suitable deodorizing agent or compound, that the disagreeable odors emitted from its contents will be entirely overcome or neutralized.]

52,321.—Machine for Hulling Cotton Seed.—John B. Ruperts, Jersey City, N. J.:

First, I claim the blades or knives as described, in combination with a series of segmental blocks interposed between them so as to hold the larter in place and adjustable in radial directions, substantially as set forth.

Second, I claim placing the central block, K, on the bed plate, J, when the same has a flange, U, projecting over the inner ends of

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the blocks, Q, and when its top is made convex, substantially as described.

52,322.—Chimney Cap.—Harvey Reynolds, New York City:

I claim the combination of the tubes, A and B, with the passage, C, arranged substantially as shown and described to form a new and improved chimney cap or ventilator.

52,323.—File Clasp for Documents, Etc.—Ithiel S. Richardson, Boston, Mass.:

I claim the application of wire bent in the forms above described, together with the plates and springs of spiral springs in continuation, to be used for the filing or docketing of papers and documents, suostantially as above set forth, and denominated the spiral spring file holder.

52,324.—Hydraulic Jack.—Joseph Ryan, St. Louis, Mo.:

I claim the combination, substantially as herein described, of a reservoir, c and pump, L, with each other and with the cylinder, E, of a hydraulic jack, when the reservoir is secured to the cylinder, substantially in the manner herein set forth.

I claim also, in combination therewith, the cylindrical plunger or piston, c cylinder, E, arranged and operating substantially in the manner herein set forth.

52,325.—Process of Parting Gold, Silver, and Copper.—George A. Scherpf, Hoboken, N. J.:

I claim the combination of this production of such or any other compounds, whereof sulphuric acid or sulphurous acid is one of the first bases, with the parting of the above-named metals by sulphuric acid, as described herein.

52,326.—Artificial Teeth.—Sparkman R. Screven, Philadelphia, Pa.:

I claim a F fastening, constructed as and for the purpose as herein shown and described.

52,327.—Harvester.—John F. Seiberling, Doylestown, Ohio:

First, I claim a reel hub in which the sockets for the short arms project from or near the extreme outer ends of the sockets for the long or radial arms substantially in the manner and for the purposes described.

Second, I claim the adjusting bolt, S', in combination with the rubber spring or its equivalent, and the stiff pendent, B, for supporting the pulley and giving tension to the band or chain, substantially in the manner described.

52,328.—Mode of Attaching Car Wheels to Axles.—George Sewell, Brooklyn, N. Y.:

I claim the two stuffing boxes, the collar h, and annular plate, K, all arranged with reference to each other and to the chambered hub, substantially as set forth for the purpose specified.

52,329.—Lightning Rod.—A. S. Sherwood, Detroit, Mich.:

I claim the combination of the turned or wired copper ribbon, with the corrugated tubular top, substantially as and for the purpose described.

52,330.—Broom Head.—John E. Short, New Richmond, Ohio:

I claim constructing a broom head out of sheet metal and wire, in the manner described by the specified construction and arrangement of the head, A, wires, B B', pins, D, socket, C, and handle, H, for the purposes set forth,

52,331.—Skate.—Harrison N. M. Smith, Philadelphia, Pa.:

First, I claim a sliding heel pin for the purpose, as herein shown and described.

Second, The combination of the sliding heel pin, d, and the hinge or joint, c, as is herein shown and described.

52,332.—Operating Window Blinds.—Henry Smith, Salem, Mass.:

First, I claim compensating for the increased or diminished power of a coiled spring in its various degrees of tension, by means of a pinion working in a scroll gear or volute-toothed rack, whether said rack is wound on a plane surface or on the periphery of a cone, substantially as described.

Second, The combination of the voluta gear-traveling pinion, spring and shade roller, for the purpose of controlling the power of the spring in its action upon the said roller as described.

52,333.—Mode of Operating Window Sash.—Henry Smith, Salem, Mass.:

I claim a window sash having a rack, c c, operated by means of the volute gear-traveling pinion and spring, all substantially as described.

In combination with the foregoing, I claim the sliding bolt, R, for locking the window as described and shown.

52,334.—Mechanical Movement.—Henry Smith, Salem, Mass.:

First, I claim the volute wheel and pinion as shown, when used in connection with a coiled spring, for the purposes described.

Second, The movable shaft, E E, and box, g g, when used in connection with the volute wheel and pinion, as already set forth.

Third, The spring, f f, when used in combination with the volute wheel and pinion, for the purposes indicated.

52,335.—Clutch for Power Press.—Norman C. Stiles, Meriden, Conn.:

I claim a clutch for connecting or disconnecting power, consisting of a bolt, d, latch f, and trip, C, arranged to operate substantially in the manner described.

52,336.—Burnishing Machine.—Nathan C. Stow, Stoneham, Mass.:

First I claim a rotating burnishing wheel, formed substantially as described for the purpose set forth.

Second, The shoe holder made substantially as described, and for the purpose set forth.

53,337.—Pruning Knife.—Jacob Surerus, Newark, N.J.:

I claim the pruning knife, A, having hollow handle, l, with screw cap, m, and cord, o, passing around a pulley, b, of one handle, and hung to the other, substantially as and for the purpose described, which cord and cap, when not in use, are incased within and by the said hollow handle, as specified.

[This invention relates to a pruning knife to be used for the trimming of trees, bushes, etc., and consists in so constructing the knife that whether to be used at a high or low point or part of the tree or bush, it can be readily adapted therefor, so that its blades can be operated to cut or sever the parts desired, without requiring the person to ascend the tree.]

52,338.—Glass Mold.—Michael Sweeney, J. E. Mathews and Thomas Hartley, Wheeling, West Va.:

First, We claim the application, in making molds for glass, of cast-iron or steel chills to their interior surfaces in casting, substantially as and for the purpose above set forth.

Second, We claim forming an enlargement around the middle of the mold, in order to obtain the equalization of heat in the mold while glass is being pressed therein, substantially as set forth.

Third, We also claim the manner substantially as above shown, of attaching handles to molds for glass.

52,339.—Knee Swell for Organs and Melodeons.—S. Taylor, Worcester, Mass.:

I claim the combination with the front of an organ or melodeon, of a hinged knee lever for operating the swell, substantially as set forth.

52,340.—Churn.—Thomas J. Thorn, Skaneateles, N. Y.:

I claim the combination and arrangement of the paddles, C and D, arranged at a right angle to each other, substantially as described with the tube, A, for ventilation, the whole arranged in the manner shown and specified.

52,341.—Wagon Wheel.—John Thrasher, West Liberty, Ohio:

I claim the hub band, B, pivoted with sockets, C, to fit the large part of the spokes, while the mortises in the hub receive the spoke tenons, all substantially as herein described.

52,342.—Saddle Tree.—Samuel E. Tompkins, Newark, N. J.:

First, I claim a gig saddletree, having its frame, B, provided with longitudinal depressions, a, and covered with a body leather, C, sunk or forced into the depressions, a, substantially as shown and described.

Second, I claim the elongating or extending of the frame, B, so that it may project below the body leather to admit of the stiffeners, D, being attached directly to it by rivets, nails, or other means, substantially as set forth.

Third, I claim the crupper loop, F, constructed and attached to the frame, B, substantially in the manner as and for the purpose specified.

[This invention relates to certain improvements in gig saddletrees, those which are constructed of malleable cast iron, and it consists in a novel construction and modification of parts whereby several advantages are obtained over gig saddletrees of the same class hitherto constructed.

52,343.—Paper Holder.—Edwin J. Toof, Fort Madison, Iowa:

First, I claim producing a pressure upon the roller by means of an elastic bar, B, or its equivalent, substantially as described.

Second, I claim constructing the roller, A, in two parts, when connected or provided with a spring, d, or its equivalent, substantially as shown and specified.

Third, I claim so constructing and arranging the frame, C, and axis, with a roller, A, that the apparatus may be extended, substantially as and for the purposes specified.

52,344.—Table or Call Bell.—Alfred W. Turner, New York City. Antedated Jan. 22, 1866:

I claim the sliding bell, placed on a spindle or arbor, which is attached to a separate base or to any table article, in connection with a spring or its equivalent, arranged to operate in the manner substantially as and for the purpose set forth.

52,345.—Composition for Destroying Insects.—Austin M. Turney, Butternuts, N. Y.:

I claim the above-described article, remedy or compound, from the above-named ingredients, as and for the purposes herein set forth.

52,346.—Pump.—Samuel Vance, Newburyport, Mass.:

I claim the securing of the glass cylinder, E, to the sockets or heads, G G', and to the pump stock, A, by means of the yoke or clamp, H, and screw, I, arranged in the manner substantially as and for the purpose herein set forth.

52,347.—Quartz Mill.—Conrad Ph. Wagner, New York City:

I claim the combination of the two crushing and pulverizing cylinders E I, arranged and constructed as described, with rotation of the two cylinders in the same direction, but one with a greatly accelerated speed over that of the other, for the purpose and operating in the manner described.

52,348.—Cultivator.—Charles C. Wells, Lyons, Iowa:

First, I claim so constructing and arranging the hounds, C C, front cross beam, v, and rear beam, v", in combination with the axle, A, that the same may be adjusted by the movable bolts and holes, substantially in the manner and for the purpose herein set forth.

Second, I claim constructing and arranging the standards, D' D2, in connection with the hounds, so that they may be shifted from the straight bolts, f f, to the elbow ones, e e, substantially in the manner and for the purpose set forth.

Third, I claim the application of the stirrups, F F, to the rear of the standards, D' D2, substantially in the manner and for the purpose herein set forth.

Fourth, I claim the combination of the lever, E, with the stirrups, F F, and standards, D' D2, for raising the latter in conjunction with the feet, substantially in the manner and for the purpose as herein set forth.

Fifth, I claim the arrangement of the rear cross beam, v", in combination with the stirrups and standards, so that the latter may be moved in a lateral direction, independent of each other, substantially in the manner and for the purpose herein set forth.

52,349.—Harvester.—William N. Whiteley, Jr., Springfield, Ohio:

I claim in combination with the track clearer of a mowing machine, the stud, L, and shoulders, m m, or their equivalents for the purpose set forth.

Second, In combination with the shoe, F, the sliding bolt, d, for the purpose of rendering the shoe and cutting apparatus easy of attachment and detachment, substantially as described.

Third, The combination or arrangement of the shoe, F, sliding pin, d, bracket, C C B, and lever, E, substantially as described, so that the cutting apparatus may be attached or detached, may fall slightly below or rise slightly above the line of level with the machine, or be entirely folded over upon the machine, and so that the pitman can only be unhooked from the cutter bar when the cutting apparatus stands nearly vertical.

52,350.—Harverster.—William N. Whiteley, Jr., Springfield, Ohio:

First, I claim in combination with the tongue plate, H, the draft disks, l and k, so that the strain of the draft will be communicated through said plate to the frame of the machine and not through the tongue.

Second, In combination with the tongue of the machine, I claim the serated disks, O and O, and the hand lever, N, for the purpose set forth.

Third, In combination with the hand lever, N, I claim the hook, R, for the purpose of holding the tongue rigid when desired.

Fourth, I claim the spring S, or its equivalent for the purpose set forth.

52,351.—Harvester.—William N. Whiteley, Springfield, Ohio:

First, I claim connecting the fore ends of the rails of the main frame, by means of a metal box, substantially as described in which box the tools may be carried.

Second, I claimed the three armed bracket which supports the seat, substantially as shown and described.

Third, I claim making the journal box, for the crank shaft, and hemispherical shield for the fly wheel and crank in one, and the same piece of casting.

Fourth, I claim supporting the reel post by the braces, Q', substantially as shown and described, so that the main shaft may be adjusted between the braces.

Fifth, I claim the peculiar construction of the pulley and journal at the end of the reel shaft, in combination with the sliding box or hook in which the journal turns.

Sixth, I claim arranging the spring which presses the rake crank on its clutch pin, inside of the hub of the crank as shown and described.

Seventh, In combination with a ball-headed pivot and box working on the ball, I claim the straps on the box which fasten it to the rake head.

Eighth, I claim the spring catch, N', in combination with the rake and rake bow, for raising and dropping the rake

Ninth I claim the shield on the top of the rake as shown and described, to support the falling grain and make the rake slip out from under it with facility.

Tenth, I claim making the rear of the platform, to incline upward, in combination with the curve in the rake guide, which raises the rake over the inclined part of the platform.

Eleventh, I claim making the outer reel standard to curve outward and upward, as shown and described, in combination with the toothed plates for adjusting the reel bearer.

52,352.—Wood Splitting Machine.—William L. Williams, New York City:

First, I claim a trough, for combining the pieces of wood, formed narrower at the feeding than at the delivery end of said trough, in combination with reciprocating knives or cutters that split the wood, as set forth in order that the wood may be moved along freely in said trough without jamming as set forth.

Second, I claim extending the feeding chains along the sides of the feeding trough in combination with reciprocating knives so as to operate in delivering the split wood as set forth.

Third, I claim the yielding side piece, r, of the trough in combination with the chains, q q, and knives for the purposes and as set forth.

52,353.—Water Wheel.—L. D. Wynkoop, Owassa, Mich.:

I claim the combination of the two wheels, D B, arranged as shown in relation with the scroll, A, and connected with a shaft, H, from which the power is taken, substantially as herein shown and described.

[This invention relates to a combination of two wheels arranged in such a manner as to be acted upon one by the direct, and the other by the wasting power of the water, and a very large per centage of the power of the water which passes through the wheels obtained and transmitted to one shaft from which the power is taken.]

52,354.—Transmitting Motion.—F. Yeiser, Danville, Ky.:

I claim the worms, c c', nuts, e e', and tappets, f f', or their equivalents in combination with the guides, C, lips, g g' g* g'* and cranks, a a', in the crank shaft, A, constructed and operating substantially as and for the purpose set forth.

Also the adjustable stops, h h* h' h'* in combination with the tappets, f f', nuts, ee', worms, c c', and cranks, a a', constructed and operating substantially as and for the purpose described.

[The object of this invention relates to a mechanism intended to transmit the power and motion from a piston rod of a steam cylinder or from another reciprocating device to a crank shaft, with the least possible loss of power.]

52,355.—Wooden Piston Rods for Deep Wells.—R. N. Allen (assignor to W. R. Mould), Cleveland, Ohio:

I claim the plates, F, provided with one or more bosses, a, in combination with the section, A or B, of the rod arranged and secured together, substantially as and for the purpose set forth.

52,356.—Pea Shelling Machine.—Mellen Bray, Boston, and Joseph A. Talpey, Somerville, Mass., assignors to Wm. K. Lewis, Boston:

First, We claim the fluted or corrugated rollers, C C, of about one inch or less in diameter for expelling green peas or beans from their pods, when used in combination with the slots, b b, for presenting the pods endwise to the rollers as explained.

Second, The endless apron, B, in combination with the rollers, C C, substantially as and for the purpose specified.

Third, The vibrating hopper, E, provided with a slatted bottom, in combination with the rollers, C C, and endless apron, B, for the purpose set forth.

52,357.—Cartridge Box.—R. L. Bryan and J. A. Bigelow, (assignors to themselves and H. Everett), Franklin, Mich.:

First, We claim a cartridge box, a, provided with a series of tubes, B, to contain the cartridges, and having a rotating disk, G, provided with a spout or conductor, H, fitted or applied at one end of it, and all arranged in such a manner that the spout or conductor may be brought in line consecutively with the cartridge tubes, and the cartridges placed or deposited in the piece or fire-arm with the greatest facility, while the filled tubes are kept closed, and perfectly protected at all times, substantially as described.

Second, We further claim, the elastic arm, L, attached to the disk, ●, in combination with the watches, e, in the flange, d, of cover, F, substantially as and for the purpose set forth.

[This invention relates to a new and improved cartridge box, designed more especially for repeating or revolving fire-arms, and it consists in having a series of tubes placed within a case of cylindrical or other form, and provided at one end with a revolving disk having a spout or conductor attached, and all so arranged that the spout or conductor may be brought or adjusted consecutively in in line with the several tubes within the box and the cartridges in said tubes, deposited in the weapon with the greatest facility.]

52,358.—Water Wheel.—W. R. Close (assignor to himself and Jones T. Dinsmore), Bangor, Me.:

I claim, The application of the regulator to the water wheel and its flume, and independently of the gate of the flume, substantially in the manner, and so as to operate as specified.

52,359.—Suspended.

52,360.—Horse Rake.—R. M. Ewing (assignor to himself and L. H. Cope), Clinton, Ill.:

I claim, The arrangement of the rake head, F, hinges, G G, springs, J J, lips, I I, in combination with the thills, C C, in the manner as and for the purpose herein specified.

[The object of this invention is to obtain a horse rake which will be extremely simple in construction, readily manipulated or operated so that it may discharge its load and the teeth lowered or brought back again to their work, and the teeth allowed to yield or give to obstructions which may be in their path.]

52,361.—Railroad Turn Outs.—Robert Harper, Chelsea, Mass., assignor to E. C. Harrington, Boston. Antedated Jan. 17, 1866.:

First, I claim the rails, c c, constructed and used at the fork or branch of a railroad for cars to be drawn over by any kind of power, substantially as described, and for the purpose specified.

Second, The base, a a, of the rails constructed and used, substantially as described, and for the purpose specified.

Third, The tongue or wedge, b, constructed and used, substantially as described, and for the purpose specified.

Fourth, Making the flange, c, of the said rails or a curve when combined with the turn out rails and with wedge, 6, substantially as described and for the purpose specified.

52,362.—Spark Arrester.—C. F. Jauriet, Aurora, Ills. assignor to himself and A. J. Ambler, Chicago, Ills.:

First, I claim, the combination of the cap or hood, M, and the net-work or finely perforated partition, K, substantially as and for the purpose described.

Second, The arrangement of the cone, J, with the net-work partition, K, or their equivalents, constructed and applied to the spark arrester or smoke stack, substantially as and for the purpose set forth

52,363.—Quartz Mills.—Henry Kellogg (assignor to H. B. Bigelow and Daniel P. Calhoun), New Haven, Conn.:

I claim the two conical disks, E and E', constructed substantially in the manner described, having their respective shafts placed diagonally to each other in the manner herein fully set forth.

52,364.—Pump.—Theophilus Mayhew, New York City, assignor to himself and Charles Lockitt, Brooklyn, N. Y.:

First, I claim the combination with a pump bucket or plunger operated by a rope or chain, of a weight, H, arranged above the pump cylinder, and constructed and applied within the well tube, substantially as herein described, to serve the purpose not only of assisting the downward stroke of the plunger, but that of a guide to the bucket or plunger.

Second, The spring catch constructed and applied to the pump cylinder, and arranged in relation with a groove, c, in the well tube, and with pump bucket or plunger, substantially as herein described, whereby it locks the pump cylinder in the well tube during the pumping operation, but unlocks the said cylinder to permit the withdrawal of the whole pump from the tube by raising the bucket or plunger to a certain point as herein set forth.

52,365.—Door Bell.—W. H. Nichols (assignor to himself and D. W. Watrous), Chatham, Conn.:

I claim the slide, E, with the hammer rod, G, connected to it as shown in combination with the spring, D, and bell or gong, C, all arranged to operate in the manner as and for the purpose set forth.

[This invention relates to a new and improved bell or gong, to be applied to the front doors of dwellings, and also to be applied in other cases where signals or alarms are required to be given. The object of the invention is to obtain a simple and efficient hammer-operating mechanism, one which will not be liable to get out of repair, and will be capable of being manufactured at a small cost.]

52,366.—Stove-pipe Drum.—Henry B. Northup, Sandy Hill, N. Y., and James H. Patterson, Glens Falls, N. Y.:

I claim a heat radiator for stoves composed of one or more drums, having eduction or draught pipes of much smaller diameter than the drums, extending down within them nearly to the bottom, substantially in the manner as herein shown and described.

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52,267.—Picker-staff Arrester for Looms.—Ezekiel Phillips and Henry C. Phillips (assignors to Ezekiel Phillips). Blackstone, Mass.:

We claim the combination as well as the arrangements of the lever and the sprog-adjusting mechanism, substantially as described, with the spring applied to the race beam and used for the purpose of gradually arresting the picker staff, as explained.

We also claim the combination as well as the arrangement of the connecting rod, o, and the auxiliary arm, p, or their equivalents, with the two levers combined with the one spring and applied to the opposite ends of the picker staff slot of the race beam, as described.

52,368.—Sewing Machines.—Timothy K. Reed, East Bridgewater, Mass., assignor to Elmer Townsend, Boston, Mass.:

I claim a device or mechanism for relieving the loop of thread from the strain of the take-up spring, when the needle is ascending, to insure the entrance of the cast-off into the loop, substantially as described.

52,369.—Lamp.—Edward F. Rogers (assignor to himself and Alfred K. Hills), Boston, Mass.:

I claim the combination and arrangement of one or more vapor ducts, d d, and the foraminous tube, c, with the wick tube, a, and the fluid reservoir, c.

I also claim the combination of the mass of sponge, , or an equivalent absorbent material, with the reservoir, C, the foraminous tube, c, the wick tube, a, and one or more vapor ducts, d d, the whole being arranged substantially in the manner and so as to operate as specified.

52,370.—Cartridge for Fire-arms.—John W. Smith, Iowa Point, Kansas, assignor to himself, Lewis Hidelberger, Morris Prince, and Jos. Bocharach:

I claim the use of the wire-gauze tube for the purpose of forming the cavity in the cartridge, as aforesaid.

52,371.—Paper-collar Band.—George K. Snow, Watertown. Mass., assignor to himself, March, Brothers, Pierce & Co., Boston, Mass.:

I claim as my invention the above-described manufacture, or continuous band of paper formed with the bending crease and the imitation of stitching, or other, and so as to be capable of being cut up into a series of collars or wristbands, in manner as specified.

52,372.—Lock.—Herbert Allman, London, Eng.:

I claim the combination of the struts, C, fence piece, B, lever, D, notches, d d', arranged relatively to each other and with the bolt, A, to operate in connection with a proper key, in the manner and for the purpose herein specified.

[The improvements in the within-described lock relate to the construction of the bolt or fastener, the key, and a part termed a fence piece, and also certain parts termed struts.]

52,373.—Bottle Handle.—George Ireland, Birmingham, Eng. Antedated Jan. 26, 1866:

I claim combining the encircling claps, C and D, and the neck clasp, E, with the handle, B, to form a self-adjusting handle for bottles, substantially as herembefore described.

52,374.—Sewing Machine.—Amos H. Boyd, Medway, Mass. Patented in England July 18, 1862:

First, I claim the method of operating the arms which carry the embroidering threads or cords by means of the pin moving radially in diagonal slots in said arms, substantially as described.

Second. Making the slots adjustible to vary the extent of movement of said arms, substantially as described.

Third, The employment, in combination with the arms, G G, or their equivalents, for carrying the embroidering material, of the fingers, t t' t2, either collectively or singly, and operating substantially as described.

Fourth, In combination with the fingers, t t 12, or either of them, operating as described, I claim the device, W, or its equivalent, for the purpose of interrupting the operation of said fingers, in any required order, substantially as described.

52,375.—Fire Places.—Granville, Piqua, Ohio:

First I claim the portable ridge-roofed box furnace, constructed substantially as herein described, adapted to be set in an ordinary fire place, as described, in combination with induction and eduction pipes, as described.

Second, In combination with the box furnace, constructed, located, arranged, and operating substantially as described, I claim the damper, H, arranged and operating substantially as described.

Third, In combination with an air-heating furnace, constructed, located, and arranged as herein described, I claim an inclined offset and cavity, back of, and below, the apex of the roof of said furnace, as shown at, G, in the drawings, as and for the purposes described.

52,376.—Automatic Boiler Feeder.—Emmett Quinn, Washington, D. C.:

I claim a hollow interior tube, cylindrical or otherwise, inclosed and fitting neatly within a suitable case, both tube and case provided at or near each end with openings or ports, so arranged that when applied to a boiler, the induction ports on the outside of said boiler shall be closed when in operation before the eduction ports at the end inside the boiler shall be opened for the discharge of the water, substantially as described.

REISSUES.

2,161.—Printing Names of Subscribers upon Newspapers.—Henry Moeser, Pittsburgh, Pa. Patented June 24, 1851. Extended seven years:

First, I claim the within-described mechanical record of names and addresses of subscribers of newspapers, periodicals, etc., or correspondents to whom it is desirable to send circulars, documents, or other mail matter, said mechanical record being constituted of type, and representing said names, addresses, and so forth, locked up in a standing form or forms, capable of such changes, additions, or alterations in the names or addresses as occasion may require, and also capable of being used in connection with a press for printing said names, addresses, etc.; the said form of type being both a record or list of existing subscribers or correspondents which can be referred to from time to time for information, and a means of printing the names and addresses of subscribers, correspondents, etc., substantially as described and specified.

Second, Combining with a standing address form or forms, a mechanical record of names, etc., and a press mechanism as described, an automatic feed for moving the forms step by step for the successive address impressions, substantially as described and specified.

Third, Combining with the standing address forms or mechanical record of names, etc., and a printing and feeding mechanism as described, a shield or equivalent device, provided with a slot, to shield and protect the paper from ink except at the point of impression, substantially as described and specified.

2,162.—Process for Preserving Animal and Vegetable Substances.—Francis Stabler, Baltimore, Md. Patented Nov. 14, 1865:

I claim preserving animal or vegetable substances used for food, when wholly or partially desiccated as above described, by sealing them in air-tight vessels from which the atmospheric air has been expelled by the introduction of carbonic acid gas, or other gas that will not support combustion, substantially as described.

2,163.—Sewing-machine Guide.—Daniel Barnum, New York City. Patented Feb. 12, 1861. Reissued Sept. 13, 1864:

First, I claim the use of thin sheet or light elastic-spring metal for making automatic clamping surfaces extending out from the gaging line of a sewing machine gage and, in combination therewith, beyond the line of seam to be sewed by a needle, and so thus producing a gentle automatic spring pressure upon the upper surface of flexible material while the same is approaching the needle, and thereby automatically smoothing and holding the said material preparatory to its being sewed outside of the line of seam as well as between it and the line of gage, substantially as and for the purposes specified.

Second, I claim also the use of thin sheet or light elastic spring metal for making automatic clamping spring surfaces, as specified, when provided with diagonal corrugations, struck up thereon outside of the line of the seam to be sewed by a sewing machine needle, substantially as and for the purposes specified.

Third, I claim also the use of thin sheet or light elastic spring metal for making automatic clamping surfaces, as specified, when provided with the beveled edges which are turned or struck up as described, to facilitate an easy entrance of varying thicknesses and uneven surfaces of material under the upper clamping surface, substantially as and for the purposes specified.

Fourth, I claim also a sewing-machine gage having an upper automatic gently clamping surface in front of the gaging line, which surface, when in use on a sewing machine, will extend over and automatically press upon the upper side of the material which is being sewed beyond the line of the seam as well as between it and the gage, whether said material be of equal or unequal thickness.

Fifth, And by the use of the means mentioned in the last preceding clause, I further claim automatically removing the wrinkles from and smoothing the upper side of any soft or undressed woven fabric of unequal thickness or of uneven surface, and holding and guiding the same without basting while it is approaching the needle and being sewed, both outside of and around the needle as well as between it and the gage, substantially as and for the purposes specified.

2,164.—Stringing Pianos.—Antoine, Choplain, and Pierre E. Chollet, New York City. Patented Dec. 19, 1865:

First, We claim the use of the lever, O, substantially as described, in combination with the tension slide, B, and knife edge prop, T, arranged and operating substantially as herembefore set forth, for the purpose of registering the tension of the strings of piano fortes.

Second, we also claim the use of the lever, C, in combination with the indicator, E, and dial plate, L, or other equivalent devices for registering the tension or tone of the strings of a piano forte, substantially as herein before set forth.

2,165.—Abdominal Supporter.—Sarah A. Moody, New York City. Patented May 3, 1864:

I claim the corsets or abdominal supporters herein specified having the front extended down to the line of the pelvis so as to cover the abdomen, with elastic plates, b b, as described, and side lacings as above specified, constructed, arranged and combined, as and for the purposes herein set forth.

I also claim, in combination with an abdominal supporter, substantially as above specified, the air sacs, B, as and for the purposes herein set forth

DESIGNS.

2,244.—Plates of a Stove.—James G. Abbott (assignor to Abbott & Noble), Philadelphia, Pa. Antedated Dec. 27, 1865.

2,245.—Composition in Alto-relievo.—Henry Berger, New York City.

2,246 and 2,247.—Cook's Portable Range.—Samuel W. Gibbs, Albany, N. Y., assignor to Abbot & Noble, Philadelphia, Pa. Antedated Dec. 27, 1865. Two Patents.

2,248.—Trade Mark.—John Hoge and Robert D. Shultz, Zanesville, Ohio.

2,249.—Spoon Handle.—G. J. Mix, Wallingford, Conn.

2,250.—Bust of Abraham Lincoln.—Dayton Morgan, Chillicothe, Ohio.

2,251.—Group of Figures.—John Rogers, New York City.

2,252 and 2,253.—Cook Stove.—G. Smith and H. Brown (assignor to Abbott & Noble), Philadelphia, Pa. Antedated Dec. 27, 1865. Two Patents.

2,254.—Base of Sheet-metal Vessel.—G. H. Stone, Philadelphia, Pa.

2,255.—Bust of Abraham Lincoln.—Sarah F. Ames, Boston, Mass.

2,256.—Paper Collar.—William S. Bell, Jr., Boston, Mass.

2,257.—Flour Sifter.—Henry Meservey, Boston, Mass.

2,258.—Medallion of Gen. Grant.—James Powell, Cincinnati, Ohio.

Notes and Queries

J. U. S., of Pa.—Giffard's injector has a pipe leading from the steam space of the boiler and terminating in a point directly in front of a small pipe leading into the water space, cold water being admitted to the opening between the pipes. The steam is condensed by the cold water at this opening, thus making a vacuum in front of the steam in the steam pipe. The steam rushes forward to fill this vacuum, acquiring sufficient velocity to carry it through the water pipe into the boiler, and it drags along with it by friction a portion of the cold water surrounding the space between the pipes, thus feeding the boiler.

S. G. C., of Vt.—We do not see what advantage is to be gained by hanging a fly wheel on the journal of the crank to a foot lathe. You desire to get the weight of the wheel, as we understand it, on the down stroke of the crank, when the foot has no power, or *vice versa*, as all treadles are not hung in the same way. In our way of thinking, the disadvantage of having a large wheel hung out of center, as this would be, revolving at a high velocity, is very serious, and at quick speed would make the lathe rock like a ship in a storm.

W. S. P., of N. Y.—Illuminating gas will not explode unless it is mixed with air. If you fill a retort with bituminous coal and heat it red hot, the coal is decomposed, the elements of which it consists uniting in new forms to produce a number of substances, among them being several hydro-carbon gases, which, mixed together, constitute illuminating gas. If a pipe leads from the retort to a gas receiver, the gases will go into the receiver and fill it. For thin steel address Phelps, Dodge & Co., New York.

W. L. D., of Ky.—The induced current of the Ruhmkorff coil will produce light when passed through Geisler tubes. If the sun is represented by a globe three feet in diameter, the size of the earth will be represented by a cherry. The aggregate size of all the planets is so small compared with that of the sun that their attractions of each other do not materially affect their orbits.

H. T., of Mass.—Starch makes an excellent paste. Mix the starch with a little cold water; stir it thoroughly and pour it into boiling water, stirring the hot water as the starch is poured in.

A. F. W., of Mass.—You will find full directions for making various kinds of electric batteries in Smee's Electro-Metallurgy, published by John Wiley, of this city.

J. M. Banks inquires:—"Whether a machine that is made to do twice the quantity of work by merely having it put in another position, is patentable. The work is not only more expeditious, but better, and much more sure to come out perfect."

ANS.—In some cases the patentability of an improvement is determined by the extent of the useful results produced. If the results you describe have never before been produced, it is probable that a patent can be obtained

W. R. S., of Pa.—Plumbago is found in the azoic and metamorphic rocks. Mines of it have been worked at Central Falls, R. I.; Brandon, Vt.; Fishkill and Ticonderoga, N. Y.; Wake N. C., and other localities. It occurs in Pennsylvania in the range of rocks running southwest from Easton.

E. K. C., of Me.—The tool is a flat burnisher. The power of such an engine varies with the pressure. At a speed of 50 feet per minute and 50 pounds of pressure, it would have one eleventh of one horse-power.

E. C., of Pa.—If you are not a practical chemist, you had better not undertake the manufacture of sergents' eggs, as the manipulations are delicate and the materials are very poisonous.

V. Q. J., of Pa.—India-rubber springs are in universal use. Minors can take out patents, which, when granted, are subject, like other property, to the control of the legal guardian.

W. P. S., of Ky.—We cannot understand why it is not just as well to work steam with a given measure of expansion in one cylinder as in two.

Some one has left a valuable gold pen and pencil case at our office. The initial of the last name engraved upon the article is L.

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40,000 Drawers;
25,000 Dressing Gowns;
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17,000 Roller Towels, crash;
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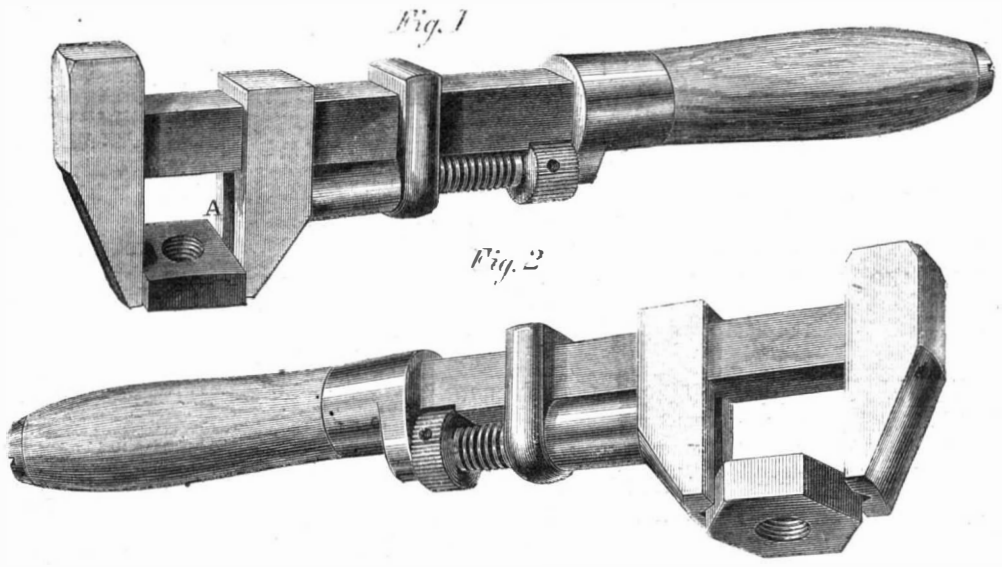
Improved Screw Wrench.

Any one who has occasion to use a screw wrench must have noticed that in many cases it is impossible to turn the nut more than one square, by reason of some part interfering with the handle or the head of the wrench. At such times it is common for careless persons to use the head of the wrench as a hammer and knock the nut around until they can get a turn on it again. It is needless to say that this is a most reprehensible practice, as it injures the nut and the wrench, besides being a waste of time.

The wrench shown herewith is one of the simplest as well as one of the most useful improvements added to it that we have ever seen. It is nothing more than a V-shaped groove, A, made in the jaws of the wrench, so that they will fit over the corners of the nut and turn it, as shown in the engraving.

All mechanics will agree with us in the utility of the addition and many will exclaim, "its a wonder no one ever thought of that before." The groove does not in any way affect the strength of the wrench, and the tool is indispensable about locomotives, marine engines, agricultural machines, and printing presses; in short, all mechanism which is necessarily compact. The groove is of such a form that it does not touch the sharp edge, but the sides contiguous to it. For use on mowing machines, reapers, and general farm purposes, it will be found a great advantage. It is now in use in the following machine shops, in Maine: Portland, Co., "Staples," Winn, and in the railroad repair shops, also in carriage factories.

By the addition of the hole in the milled head of the screw, a nail or any small rod can be used to set the jaws up very tight, so that the wrench can be employed as a hand vise, or to screw up round bolts. Any mechanic can see its utility at a glance, and further remark is therefore superfluous. The back of the jaw is made rounding to secure additional strength. A patent was issueed to Edward P. Furlong, Jan. 23, 1866; for further information address him at Box 693, Portland, Maine.



FURLONG'S SCREW WRENCH.

Improved Lock.

This lock is an ingenious combination of mechanism, designed to be perfectly secure against ordinary pilferers, and to admit of many changes in its construction, so that while the general principle is the same, a slight alteration in the position of any of the tumblers, will insure an entire change in the character of the lock. The number of changes which can be made depends upon the number of tumblers and the permutation of them.

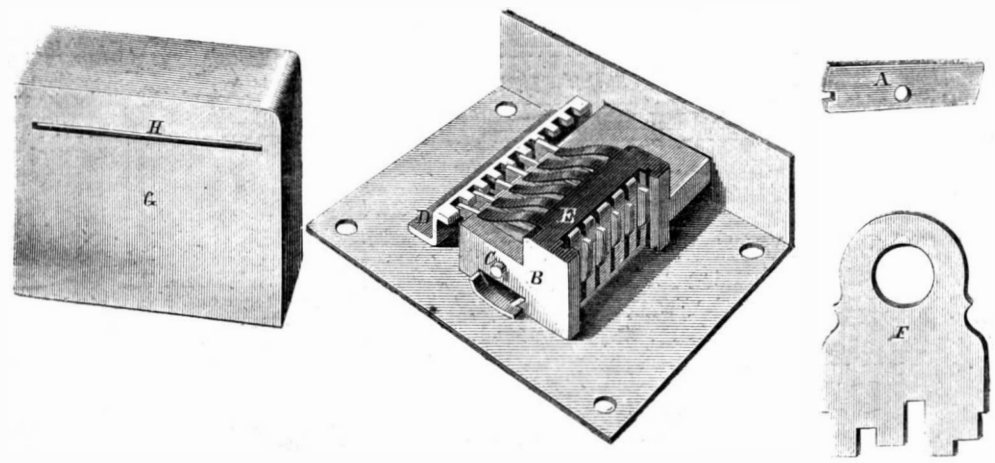
In detail the lock is quite simple, being merely a combination of straight tumblers, A, set in a frame, B, and working on a center, C, running through all. The tumblers are thus levers, one end of which is acted upon by the key; the other end is received by the ward plate, D. On top of the frame is a series of springs, E. The key is shown isolated at G, to display the interior of the lock to better advantage.

In this top plate is the keyhole, H, which is merely a long narrow slot; the key itself being a piece of sheet metal. The end of the key is cut into recesses of varying depth and length, and is so fitted as to bear on the ends of the tumblers at I, when pressure is applied, and lift them so as to pass clear of the plate, D, when the bolt can be shot back by the key. The key hole is long enough to allow it to slide for that purpose.

As each tumbler is slotted in a different part, and must be lifted to correspond with the frame, D, before the bolt can be moved, it will be seen that, practically, the lock cannot be picked.

All parts of this lock can be made by machinery, and locks for different purposes—such as padlocks, chest, drawer, trunk, or safe locks—are readily adapted to the principle. It will not fly to pieces when the top plate is removed, being complete in itself, rendering it easy to examine and adjust.

The tumblers can be quickly shifted and a new key made, if the original is lost or suspected to be in the possession of another person. The tumblers being placed side by side do not increase the thickness of the lock if a number be added. The key hole is so small that the bolt cannot be easily forced open, and each tumbler would have to be broken off before the bolt could be forced. In other respects the lock is cheaply constructed and not liable to get out of order. The patentee desires to sell the whole patent, or would allow them to be manufactured for a reasonable royalty, he having other business to attend to.



STAFFORD'S LOCK.

Patented by N. Stafford, March 7, 1865 For further information address him at No. 66 Fulton street, New York.

Something About Bolts.

One noticeable result, says the London *Engineer*, of all the innumerable experiments at Shoeburyness with armor-plating was also apparent at these trials of Chalmers's iron plates. A number of the bolts gave way under the blows of the 300-pounder. Mr. Chalmers, with a true mechanical prescience, has always given the greatest attention to those important connecting parts of his target—and of every target—the bolts. Properly proportioned to the weight and thickness of the plates, his bolts are threaded with a shallow square thread, instead of being weakened by deep V-threads. as he states to "have been invariably the case before the trial" of his first target. Lock-nuts have been generally used, and it was a feature at the late trials, for which the "royal road" engineers could not account, that the top or lock-nut generally gave way first, tearing off with it the end of the bolt. This is, however, sufficiently obvious when we reflect that, if there be the least vertical play between the bottom nut and the bolt (as there almost invariably is), all the work is thrown on the supplementary top nut. This one is generally made of a less depth, though just the contrary ought to be the case.

In preparing a window for the illumination of a photographer's dark room, Obernetter mixes an acid solution of sulphate of quinine with some gum or dextrine, and paints the mixture over a thin sheet of white paper. With this he covers the window panes, and he states that on the brightest day a window so prepared will allow no actinic light to pass.

MECHANICS
INVENTORS, MANUFACTURERS.

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